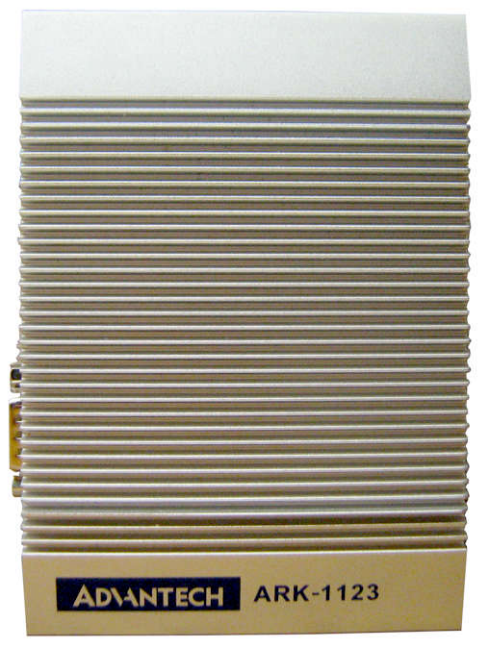

ARNI G2

ARNI-S G2 and ARNI-E G2

BOSCH

en Technical Manual

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1 Important safety instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third ground prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a car is used, use caution when moving the car/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug damage, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

2 Introduction

The **ARNI** (Audio Routed Network Interface) G2 component of an OMNEO system enhances the scalability of the system by its ability to act as a **DHCP** (Dynamic Host Configuration Protocol) server which eliminates the need to use the IPv4LL protocol. As a DHCP server, ARNI G2 supports one (1) subnet when there is no DHCP server available. It can act as a **DNS** (Domain Name System) server, storing the **DNS-SD** (Domain Name System – Service Directory) records of nodes and responding to controller queries, meaning standard DNS can be used for DNS-SD and name resolving. ARNI G2 also extends the use of **PTP** (Precision Time Protocol) over multiple **IP** (Internet Protocol) subnets by acting as a boundary clock, synchronized to a master clock using unicast PTP and acts as the clock master in its own subnet using multicast PTP to synchronize the OMNEO nodes.

Notice!
PTP is a protocol allowing synchronization of all connected equipment so the same audio clock is used throughout a computer network. On a local area network, it achieves clock accuracy in the
sub-microsecond range, making it suitable for measurement and control systems.

Notice!
When deploying a third party Dante capable device in a subnet with ARNI-E or ARNI-S as the local clock master, verify the device is not set in the Dante Controller as the “preferred” clock master.

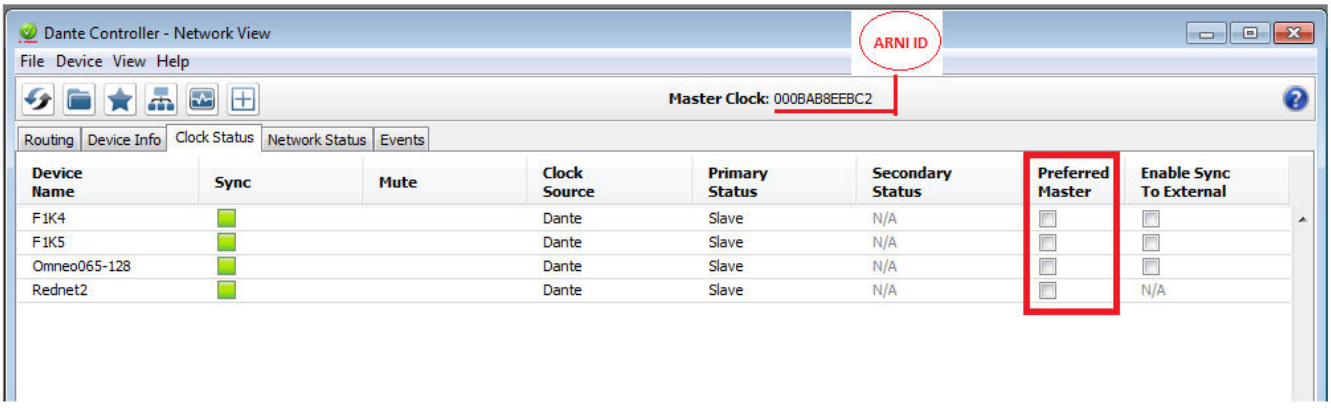


Figure 2.1: Dante Controller

ARNI G2 devices allow up to 450 OMNEO nodes on a single subnet and up to 40 subnets allowing up to 10,000 OMNEO nodes in a system.

There are two (2) versions of ARNI G2 devices for you to use based on the type of network system you have installed:
ARNI-S G2, page 9
ARNI-E G2, page 9

Notice!
A subnet containing up to 128 OMNEO devices does not require an ARNI-S G2; however, subnets containing 129 – 450 OMNEO devices does require the use of an ARNI-S G2.

2.1 Features

- Intel Celeron J1900 Quad Core 2.0 GHz SoC
- GBit Ethernet
- USB interface
- Supply 12 VDC
- IP v4

2.2 Reference view

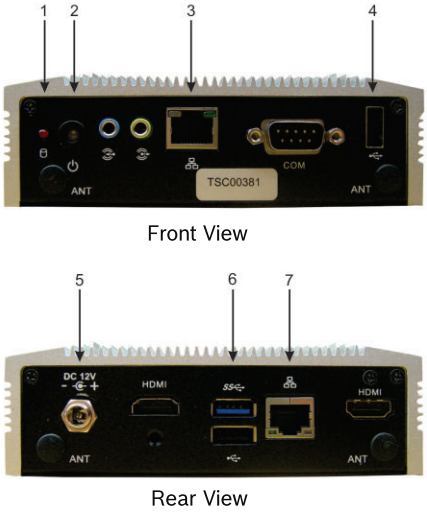


Figure 2.2: ARNI reference view

1. SSD LED = red
2. Power Button & LED = green
3. LAN Port 1
4. USB Port
5. DC Input –2-position header power supply connector
6. USB Port

NOTE: The connectors not described are used for computer peripherals (monitor, keyboard, mouse, etc.)

2.3 DNS delegation

DNS delegation is the practice of designating DNS servers across subnets which can provide failover protection, lighter DNS query traffic concentrated to a single DNS server, and can expand the namespace for system simplified system expansion, if needed.
In the case of an ARNI G2 device, DNS delegation is used between ARNI G2 devices and networks outside the OMNEO system.

Each ARNI G2 device acts as a DNS server within its own subnet. The ARNI G2 devices use DNS delegation to redirect a specific DNS query to the correct ARNI G2 device.

In a single subnet system, the ARNI-S G2 can redirect non-OMNEO requests to a DNS server outside the OMNEO system.

In a system with multiple subnets, an ARNI-E G2 is aware of all the subnets and their respective DNS server (ARNI G within the subnet). An ARNI-E G2 can use DNS delegation for non-OMNEO requests. This means the ARNI-E G2 can redirect a non-OMNEO request to a DNS server outside the OMNEO system.

3 ARNI G2 types

3.1 ARNI-S G2

ARNI-S (ARNI-Standard) **G2** supports up to 450 OMNEO nodes in a single subnet standalone environment. The ARNI-S G2 can also be used in routed networks to support subnets of up to 450 OMNEO nodes.

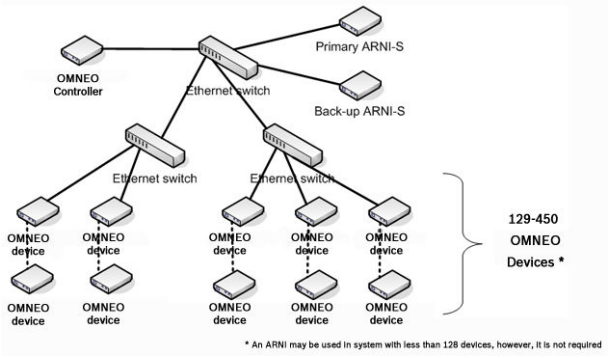


Figure 3.1: ARNI-S Standalone Operation (single IP subnet)

ARNI-S standalone operation (single IP subnet)

In the figure above, the ARNI-S G2 is in standalone operation with a redundant ARNI G2 running seamlessly in the background. Using this configuration, you can have up to 450 OMNEO nodes (including the OMNEO controller). In this capacity, the ARNI-S G2 acts as a DHCP Server and/or DNS Server for the OMNEO controller and/or the OMNEO nodes, as well as the **PTP** clock master on the subnet.

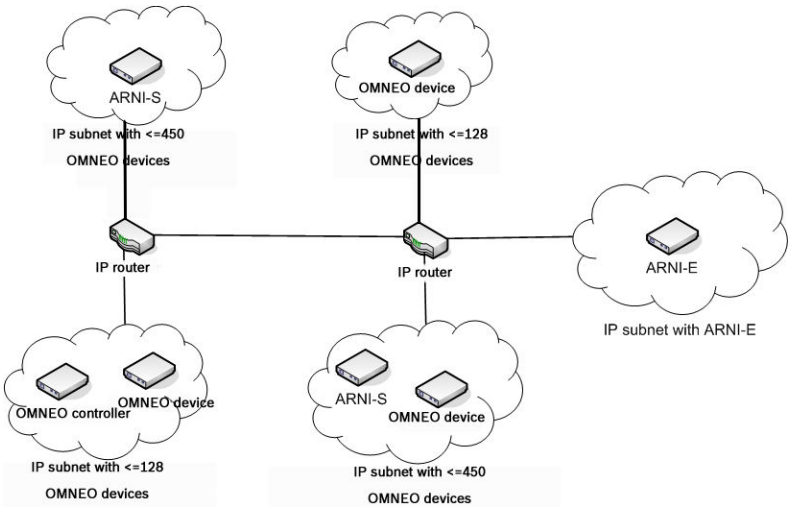
See also

– *ARNI-S Standalone Operation (single IP subnet), page 9*

3.2 ARNI-E G2

ARNI-E (ARNI-Enterprise) **G2** supports up to 10,000 devices across 40 subnets when used in parallel with an ARNI-S G2. By itself, the ARNI-E G2 can support up to 450 devices that are not supported by an ARNI-S G2 (for example, five (5) subnets of 90 OMNEO nodes or 10 subnets of 45 OMNEO nodes).

ARNI-E serving multiple subnets



The ARNI-E G2 supports several small subnets (up to 128 OMNEO nodes per subnet) as well as larger subnets (up to 450 OMNEO nodes). The large subnets must have an ARNI-S G2 device, as shown. The ARNI-E G2 acts as a clock master for the complete system. If present, the ARNI-S G2 synchronizes to the ARNI-E G2, and acts as the subnet clock master. On subnets without an ARNI-S G2, one (1) of the OMNEO nodes becomes the boundary clock.

Notice!

Subnets without an ARNI G2 device require proper configuration on the subnet. The DNS Domain must be set as parent.bosch.omneo (for example, that of the ARNI-E G2) and the DNS server must be the ARNI-E G2, which is in a different subnet from the node. These subnets need an external DHCP server. This external DHCP server assigns the ARNI-E G2 as the DNS Server.

An ARNI-E G2 can also act a subnet clock if OMNEO devices are present on the subnet where the
ARNI-E G2 resides.

4 Planning information

4.1 Planning

Notice!
Read this section completely before using the ARNI G2 Configuration Tool.

Before you start using the ARNI G2 Configuration Tool, understanding your network environment is essential. It is recommended you work with your company's network administrator to understand the environment currently in place and how your OMNEO/ARNI G2 system fits into the overall network design.

Before meeting with your network administrator, consider the following:
- How many OMNEO nodes are you going to use?
- How many ARNI G2 devices are you going to use?
- Are you going to have a single subnet or a multi-subnet system?
- Are you going to use *DNS delegation, page 7*?

Your network administrator can also give you some of the required information you must have before configuring your ARNI G2 devices and then connect them to the network.

Notice!
In a non-redundant system, ARNI has one (1) static IP Address. If there are two (2) ARNI G2 devices in the same subnet, for redundancy purposes, they both have a static IP Address; however they share a virtual IP Address which is needed to fulfill the redundancy function.

Your network administrator can provide you with the following:
- The IP subnets to be used with the system
- The DHCP range of addresses for each subnet
- The Static IP Address for a non-redundant ARNI G2 device
  OR
  The Static IP Addresses for a redundant ARNI G2 system, the shared IP Address, and the physical IP Address of the primary and secondary ARNI G2 device
- A computer on which the ARNI G2 Configuration Tool is installed and is configured to retrieve IP settings automatically (via DHCP)

4.2 Preparation

Using the information you gathered from the network administrator, it is suggested you create a physical list of the following:

- The fixed IP Address for the ARNI G2.
- The network address and subnet mask of the subnet you are configuring ARNI G2.
- If using a redundant system, the primary ARNI G2 device name, the IP Address, the secondary ARNI G2 device name and IP Address, and the shared IP Address.
- The range of Addresses assigned for you to use for DHCP.

When you have this information collected, you can begin to configure your ARNI G2 devices and put them on the network. To begin, see *Installation, page 14*.

5 Installation

The **ARNI G2 Configuration Tool** is used to configure both types of ARNI G2 devices: the ARNI-S G2 in standalone mode or slave mode and the ARNI-E G2. It is used to configure the application offline or make online configuration updates of the ARNI G2 devices.

The ARNI G2 Configuration Tool is used to:
- Configure offline
- Prepare offline
- Configure online

When the ARNI G2 Configuration Tool is installed, the factory default settings allow standalone operation of an ARNI G2 in a single subnet.

5.1 What's in the box

Verify the following items are in the box:
- ARNI-E G2 or ARNI-S G2
- Restore USB drive
- Power supply
- Important safety instructions booklet

5.2 System requirements

- Operating System
  - Windows 7 – 64-bit
  - Windows 8 – 64-bit
- Microsoft .NET Framework 4 installed
- Microsoft Visual C++ 2010 Redistributable packets installed

5.3 Installation

TIP Before installing your ARNI G2 device, become familiar with your network topology and how the ARNI G2 will integrate into the network system. For more information, talk with your network administrator and see *Planning, page 11*.

Notice!
When connected to power, the ARNI G2 device turns on and tries to connect to the network. Because every ARNI G2 device is given the same default IP Address, configure one (1) ARNI G2 device at a time before moving it to the live network.

Notice!
Input 12 VDC
The ARNI and its power supply can be used up to ambients of 131°F (55°C).

To **install the ARNI G2 device**, do the following:

1. Read *Planning information, page 11*.
2. Plug the **power supply into the power outlet**.
3. Connect **ARNI G2** to the power supply.
   ARNI G2 automatically tries to connect to the network.
4. Push the power button on.
   The Power LED displays green.
5. Connect an **RJ-45 connector to the LAN 1 Ethernet port** on the front panel of the ARNI G2 device.
   Within seconds the LEDs start blinking. If you use the port on the back, the LEDs do not blink.

Notice!
Before starting, verify the ARNI G2 firmware is present on the PC running the Firmware Upgrade Tool by running the ARNI Installer: SetupOMNEOArniFirmware64.msi or SetupOMNEOArniFirmware.msi (32-bit version).

NOTICE!

1. Using the ARNI Configuration Tool, configure **ARNI G2** using one (1) of the following options:

Notice!
The PC running the ARNI G2 Configuration Tool software must be set to obtain its IP address via DHCP.

- *Single subnet ARNI G2: configuring offline configurations , page 23*
- *Multiple subnet ARNI G2: configuration offline configurations, page 37*
- *Online configuration, page 53*

2. When the configuration is complete, connect **ARNI G2** to your existing network.

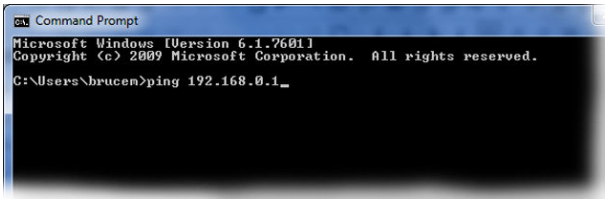
6 Connectivity

ARNI G2 is a network device and needs to be connected via Ethernet. Checking network accessibility and verifying ARNI G2 is configured for the correct interface is essential.
To **verify ARNI G2 is connected to the PC running the ARNI Configuration software**, do the following:

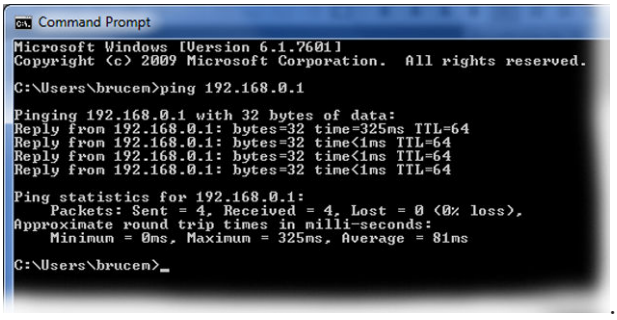
Notice!
Verify the PC running the ARNI G2 Configuration Software is on the same subnet as the ARNI G2 device.

1. From the start menu, select **All Programs|Accessories|Command Prompt**.
   The Command Prompt window appears.
2. At the prompt, type **ping <192.168.0.1>**.

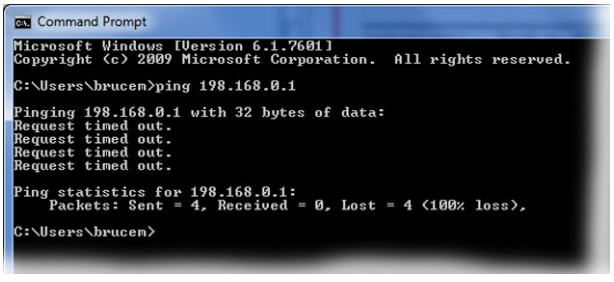
Notice!
Unless you have changed the IP Address through configuration, the default IP Address for the ARNI G2 device is 192.168.0.1.



1. Press **Enter**.
   If successful, a successful ping report appears.



OR
If unsuccessful, a timeout report appears. This signifies the ARNI and PC are not in the same subnet or are not connected to the same network.



7 Configuration

7.1 ARNI configuration tool introduction

The **ARNI G2 Configuration Tool**, also known as ACT, is used to add, modify, and remove ARNI G2 devices to or from your OMNEO system.

ACT has five (5) options for configuring your ARNI G2 for your system:

- *Single subnet ARNI G2: configuring offline configurations , page 23*
- *Single subnet ARNI G2: preparing offline configurations, page 28*
- *Multiple subnet ARNI G2: configuration offline configurations, page 37*
- *Multiple subnet ARNI G2: preparing offline configurations, page 44*
- *Online configuration, page 53*
- Add an ARNI to an existing system
- Replace an ARNI in an existing system
- Remove an ARNI from an existing system

7.2 ARNI G2 configuration tool window descriptions

7.2.1 General settings

The **General Settings** tab is used to configure most of the general node settings for the selected ARNI G2.

Notice!
Each of these settings must be configured for each ARNI G2 device.

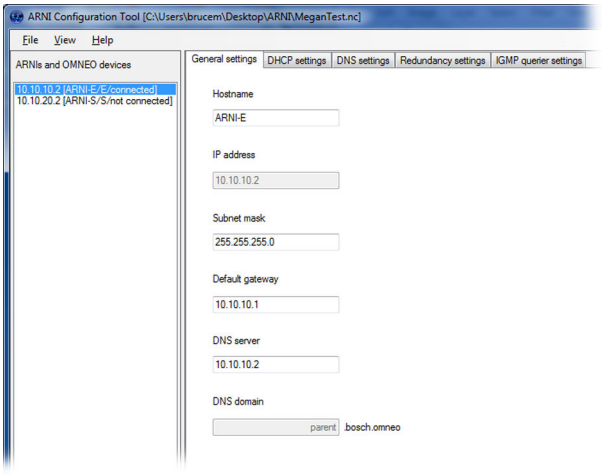


Figure 7.1: General Settings Page

Hostname Field
The **Hostname** field is used to enter the name of the ARNI G2.
The factory default value is *Bosch-arni*.

IP Address Field
The **IP Address** field displays the IP Address of the ARNI G2.
The factory default value is *192.168.0.1*.

Notice!
This address cannot be part of the DHCP address pool if the DHCP server is enabled and is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or multi-cast (224.* - 239.*).

Subnet Mask Field
The **Subnet Mask** field is used to enter the subnet mask of the ARNI G2.
The factory default value is *255.255.252.0*.

Default Gateway Field
The **Default Gateway** field is used to enter the IP Address of the default gateway of the ARNI G2.
The factory default value is *none (an empty field)*.

Notice!
The default gateway is mandatory for a multi-subnet system and must be the IP Address of the router driving the subnet the ARNI G2 resides.

DNS Server Field
The **DNS Server** field is used to enter the IP Address of the DNS Server of the ARNI G2.
This address should be the same as the IP Address field.
The factory default value is *192.168.0.1*.

DNS Domain Field
The **DNS Domain** field displays the DNS domain name for the ARNI G2.

Notice!
This DNS domain name must always end with *bosch.omneo* for an ARNI-S G2. For the ARNI-E G2, the DNS domain is fixed to parent.bosch.omneo.

The factory default value is:
For ARNI-S G2, *subnet1.bosch.omneo*
For ARNI-E G2, *parent.bosch.omneo*

7.2.2 DHCP settings

The **DHCP Settings** window is used to configure the DHCP settings for the ARNI G2, if applicable.

Most DHCP server settings are derived directly from the general settings:

- The IP subnet is derived from the IP Address and subnet mask of the ARNI G2.
- The subnet mask is equal to the subnet mask of the ARNI G2.
- The DNS server the DHCP server assigns is the same as the DNS server of the ARNI G2.
- The default gateway is the same as the default gateway of the ARNI G2.

Notice!
Each of these settings must be configure for each ARNI G2 device.

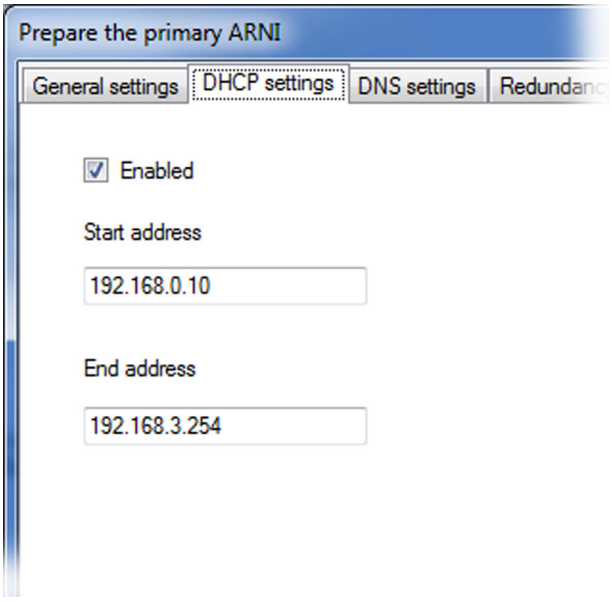


Figure 7.2: DHCP Settings Page

Notice!
These default settings enable the DHCP server of the ARNI G2 to assign up to 1013 IP Addresses in the IP subnet. The pool of addresses should not contain the static IP Addresses assigned in the subnet.
It is a good practice to have the pool size twice the size of the actual devices you expect in your network.

Enabled Check Box
The **Enabled** check box indicates the DHCP server is active. Clear the check box to disable DHCP.
The factory default for this field is *enabled*.

Start Address Field
The **Start Address** field is used to enter the start address of the pool of IP Addresses the DHCP server uses.
The IP Address pool consists of the start and end address and all addresses in between. This address is not allowed to be higher than the end address and all addresses in between.

Notice!
This field cannot be left empty, is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or
multicast (224.*-239.*).

The factory default value is *192.168.0.10*.

End Address Field

The **End Address** field is used to enter the end address of the pool of IP Addresses the DHCP server uses. The IP Address pool consists of the start and end address and all addresses in between. This address is not allowed to be higher than the end address and all addresses in between.

Notice!

This field cannot be left empty, is not allowed to be 0.*, loopback (127.*), link local (169.254.*), or multicast (224.*-239.*).

The factory default value is *192.168.3.254*.

7.2.3 DNS settings

The **DNS Settings** window is used to configure the DNS Server. Always configure the ARNI G2 as the DNS Server using the DNS settings.

Notice!

The ACT software can determine the DNS settings of an ARNI-S G2; however, the user must configure these settings for an ARNI-E G2.

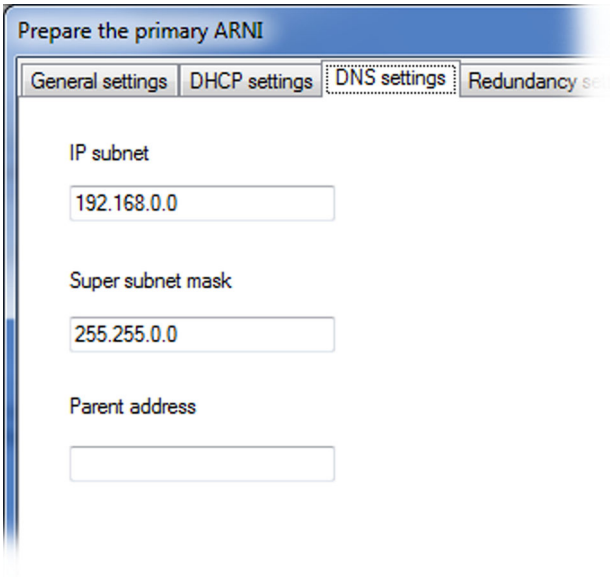


Figure 7.3: DNS Settings Page

IP Subnet Field

The **IP Subnet** field is used to enter the IP subnet address of the DNS server. In case of a multi-subnet system, this subnet must be a supernet of the different subnets that are part of the system for the ARNI-E G2. In case of an ARNI-S G2, this parameter does not have to be configured because it is directly derived from the IP Address and subnet mask of the ARNI G2 itself.

The factory default value for this field is *192.168.0.0*.

Super Subnet Mask Field

The **Super Subnet Mask** field is used to enter the subnet mask of the DNS Server. This setting must be 8-bit aligned.

Notice!
Super Subnetting is the process of splitting a subnet into network and host identifiers. Super Subnetting lifts the restrictions of subnetting and allows these addresses to be routed via **CIDR** (Classless Inter-Domain Routing) routing protocol.

The factory default value for this field is *255.255.0.0*.

Parent Address Field
The **Parent Address** field is used to enter the parent DNS server address to which the ARNI G2 device delegates requests it cannot handle itself. The parent address is needed to perform DNS delegation. In DNS delegation (see *DNS delegation, page 7*), the parent address is sent queries the ARNI G2 device cannot complete (for example, internet browsing from an OMNEO node if the parent DNS server is set as the ISP DNS server).

– In case of an ARNI-S G2 in a multi-subnet system, this parameter does not have to be configured because it is always the IP Address of the ARNI-E G2.
– In the case of an ARNI-E G2 (or ARNI-S G2 in standalone mode), this address can point to a third party DNS server.

Notice!
This address cannot be part of the DHCP address pool if the DHCP server is enabled and is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or multi-cast (224.* - 239.*).

The factory default value for this field is *None (an empty field)* for an ARNI-E G2 or ARNI-S G2 in standalone mode.

7.2.4 Redundancy settings

The **Redundancy Settings** tab is used to configure two (2) ARNI G2 devices (referred to as peers) for failover protection of your ARNI G2 devices. If one (1) device malfunctions, there is a backup ready to take its place with seamless switch-over.

Notice!
A redundant ARNI G2 consists of a primary and secondary ARNI G2.

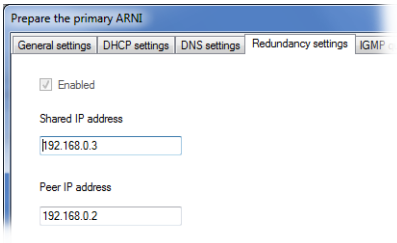


Figure 7.4: Redundancy Settings Page

Enabled Check Box
The **Enabled** check box indicates the redundancy status of the ARNI G2. Clear the check box to disable the redundant ARNI G2.
The factory default value for this field is *disabled*.

Shared IP Address Field
The **Shared IP Address** field is used to enter the IP Address shared between the two (2) ARNI G2 devices in the redundant system.

Notice!
This address cannot be part of the DHCP address pool if the DHCP server is enabled and is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or multi-cast (224.* - 239.*).

The factory default value for this field is *192.168.0.3*.

Peer IP Address Field
The **Peer IP Address** field is used to enter the IP Address of the peer ARNI G2.

Notice!
This address cannot be part of the DHCP address pool if the DHCP server is enabled and is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or multi-cast (224.* - 239.*).

The factory default value for this field is *192.168.0.2*.

7.2.5 IGMP querier settings

The **IGMP** (Internet Group Management Protocol) Querier Settings tab is used to configure the IGMP query function. The IGMP querier functionality of the ARNI G2 can be activated if no other IGMP querier is available in the network (which is normally in a single subnet system). In a multi-subnet system, the IP router acts as the IGMP querier.

Notice!
By activating the IGMP querier, multi-cast routing in an Ethernet subnet may be enabled, if the switches support IGMP snooping.

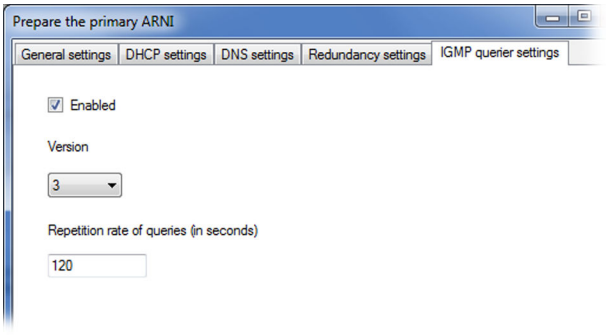


Figure 7.5: IGMP Querier Settings Page

Enabled Check Box
The **Enabled** check box indicates the IGMP Querier is active. When it is active, the ARNI G2 regularly sends out IGMP query messages.
The factory default value for this field is *disabled*.

Version Drop Down Menu
The **Version** drop down menu is used to select the IGMP version the querier uses. The version can only be version 2 or version 3. IGMP version 1 is not supported
The factory default value for this field is *3*.

Repetition Rate of Queries (in seconds) Field

The **Repetition Rate of Queries (in seconds)** field is used to enter the amount of time, in seconds, between regular query messages.

The repetition rate indicates how often the query is sent out by the ARNI G2 device.

Decreasing the factory default increases the load on the network because IGMP messages are sent more frequently which increases the value. Increasing is not advised because the IGMP snooping switches also use their own timeouts for removing a multicast routing table entry based on timeouts (for example, it expects to see the IGMP join message regularly) therefore increasing the rate may have switches stop forwarding the multicast traffic while the device is still there.

The factory default value for this field is *120*.

8 Operation

8.1 Single subnet ARNI G2: configuring offline configurations

The **Off-line Configuration** is used to configure you ARNI G2 device on a staging network, then when you finish configuring the device moving it to your live network to start using it.

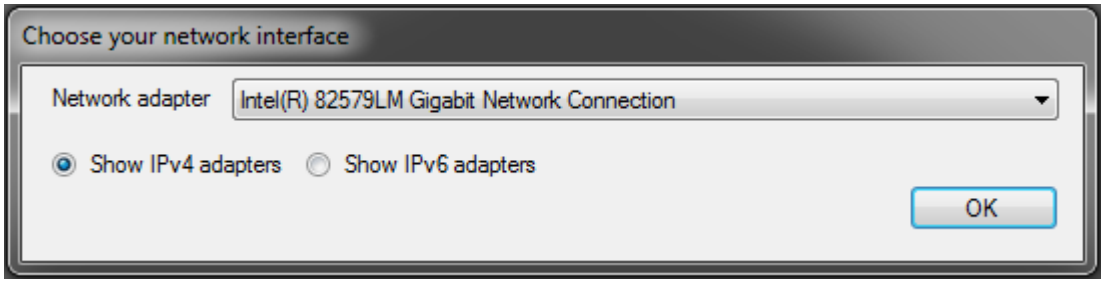
Notice!
Before using this tool, consult your network administrator about the design of your company's network. For more information, see Planning.

Prerequisites
- IP subnet for system
- For non-redundant ARNI G2, an IP Address
- For redundant ARNI G2 system, the shared IP Address and the physical IP Address of the primary and secondary ARNI G2
- IP Address pool range of the DHCP server in the subnet
- PC must be configured to obtain an IP Address automatically (for example, DHCP)

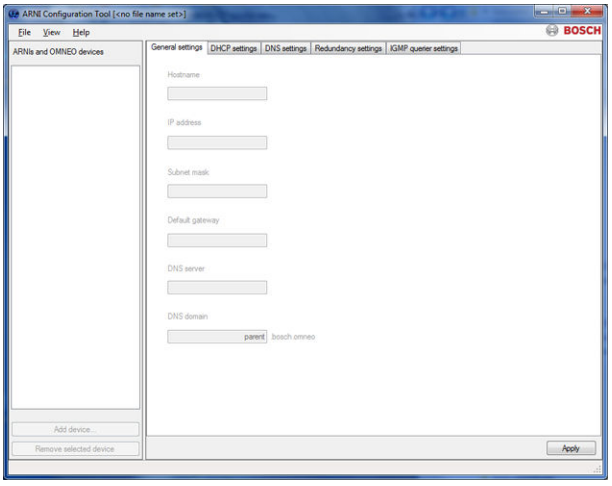
To **configure a single subnet off-line**, do the following:
1. Power on the **Primary ARNI G2** (can be either an ARNI-E G2 or an ARNI-S G2).
2. Connect the **PC on which the ACT software is installed and connected to the primary ARNI G2**, waiting for it to receive a static IP Address.

Notice!
If a redundant ARNI G2 is configured, the PC should be connected to the Primary ARNI G2.

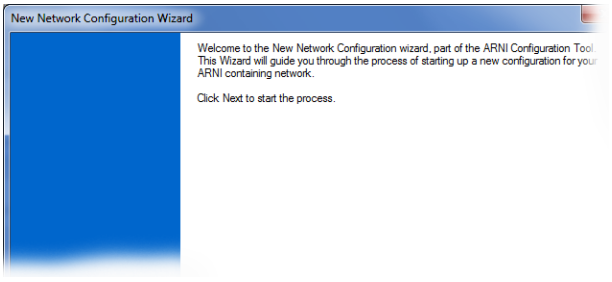
3. Open the **ACT**.
   If you have more than one (1) network adapter on the PC, the Choose your network interface window appears. If there is only one (1) network adapter available, this message does not appear.



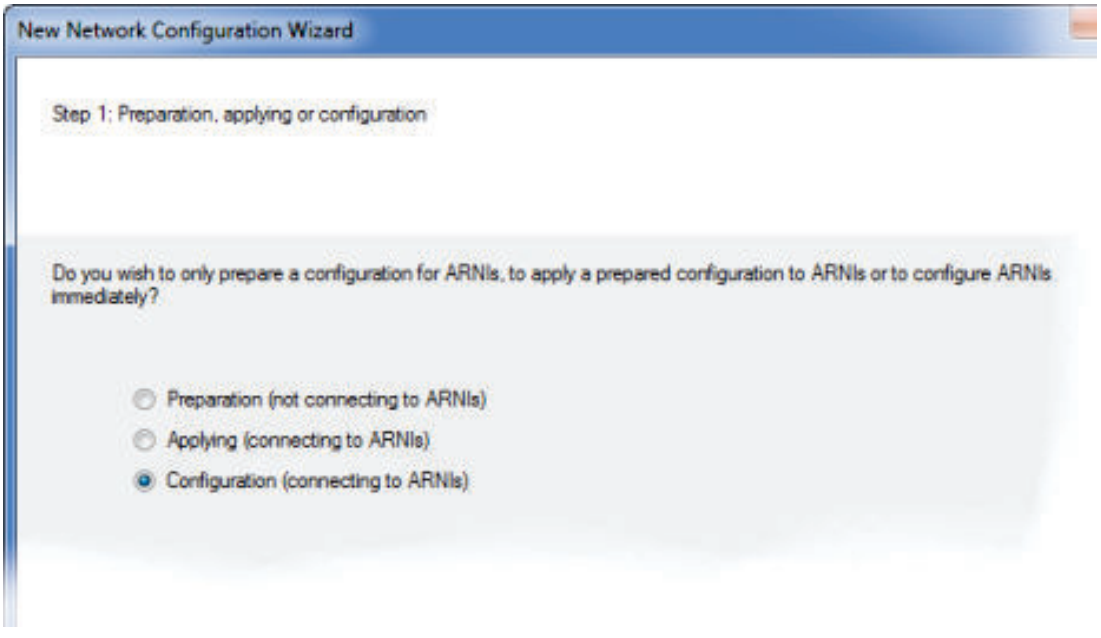
4. From the Network adapter drop down menu, select the **network adapter** you are using.
5. Select the **Show IPv4 adapters**.
6. Click **OK**.
   The ACT software window appears.



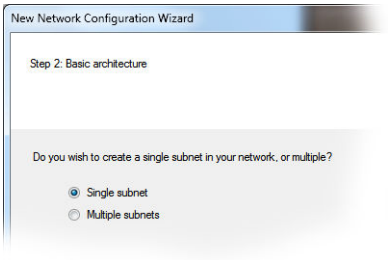
7. From the File menu, select **New Network Configuration**.
   The New Network Configuration Wizard appears.



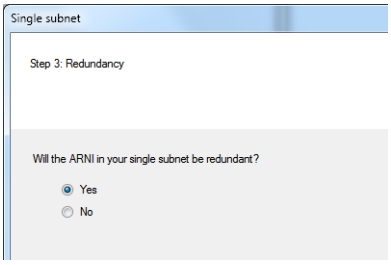
8. Click **Next**.
   The Step 1: Preparation, applying or configuration window appears.



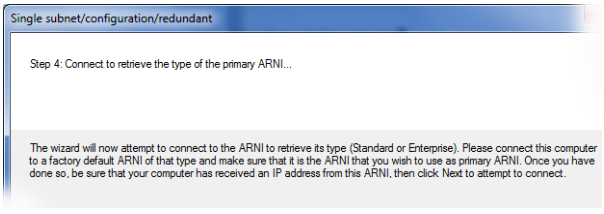
1. Select the **Configuration (connecting to ARNIs) radio button**.
2. Click **Next**.
   The Step 2: Basic Architecture window appears.



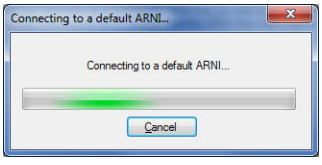
3. Select the **Single subnet radio button**.
4. Click **Next**.
   The Step 3: Redundancy window appears.



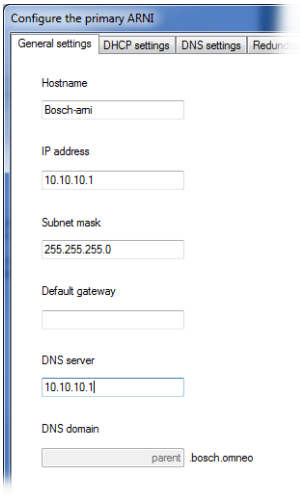
1. Select **Yes** to configure your single subnet as redundant.
   OR
   Select **No** to configure your single subnet without redundancy.
2. Click **Next**.
   The Step 4: Connect to retrieve the type of Primary ARNI message appears.



3. Click **Next**.
   The Connecting to a default ARNI message appears. A message notifying you a default ARNI has been detected and asking if you want to use this device appears.

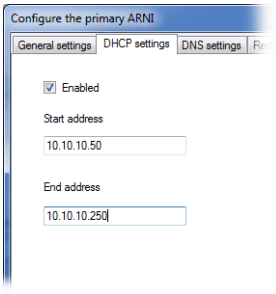


4. Click **Next**, to accept.
   The ARNI default configuration loads and can be seen on the General settings page.
5. On the General settings page, make the **necessary modifications** for configuring the ARNI G2 for your system. For more information, see *General settings, page 16*.



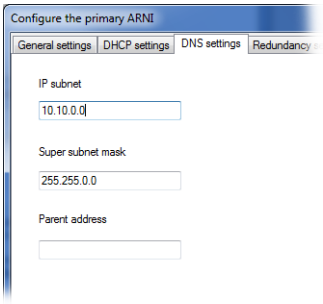
- In the Hostname field, enter the **name of the ARNI G2**.
- In the IP Address field, enter the **IP Address of the primary or non-redundant ARNI G2** (this is a prerequisite).
- In the Subnet mask field, enter the **subnet mask address of the server where the ARNI G2 is located** (for example, 255.255.252.0).
- In the Default gateway field, enter the **default gateway where the ARNI G2 is located**, if applicable.
  If using a single subnet system, this field can be left empty. Only when using a subnet that has a gateway is it necessary to allow it to connect with other subnets.
- In the DNS server field, enter the **address of the DNS Server**.
  The DNS server field must match the IP Address field.
- In the DNS domain field, enter the **DNS domain of the ARNI G2**.
  The DNS domain field is automatically populates with parent when you configure the primary ARNI G2 device.

6. If using DHCP addressing, select **the DHCP settings tab**.
   The DHCP settings page appears. For more information, see DHCP settings, page 17.



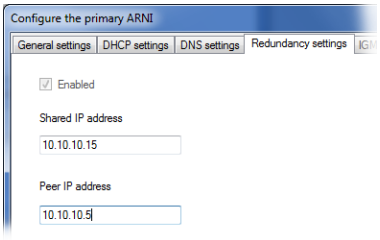
- Verify the **Enabled check box** is selected.
- In the Start address field, enter the **first address of the IP Address pool**.
- In the End address field, enter the **last address of the IP Address pool**.

7. If using a DNS server for addressing, select the **DNS settings tab**.
   The DNS settings page appears. For more information, see DNS settings, page 19.



- In the IP subnet field, enter the **IP subnet of the DNS server**.
- In the Super subnet mask field, enter the **subnet mask of the DNS server**.
  For more information, see DNS settings, page 19.
- In the Parent address field, enter the **IP Address of the parent DNS server** to which the DNS server delegates requests it cannot handle itself.
  For more information, see DNS settings, page 19.

8. If using a redundant ARNI G2, select the **Redundancy setting tab**.

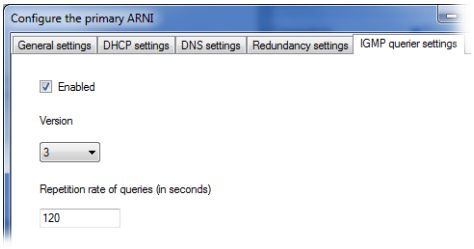


- Verify the **Enabled check box** is selected.
- In the shared IP Address field, enter the **IP Address that is shared between two (2) ARNI G2 devices**.

Notice!
This address cannot be part of the DHCP address pool if the DHCP server is enabled and is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or multi-cast (224.* - 239.*).

- In the Peer IP address field, enter the **IP Address of the peer ARNI G2**.

9. If you use IGMP, select the **IGMP querier setting tab**.
   The IGMP querier settings window appears. For more information, see IGMP querier settings, page 21.



- Verify the **Enabled check box** is selected.
- From the Version drop down menu, select **the IGMP protocol version the querier uses**.
  The version can only be 2 or 3.
- In the Repetition rate of queries (in seconds) field, enter the **time between regular query messages**.

10. Click **Apply**.
    An Applying Configuration progress message appears. Once finished, a success message appears or a failure message appears.

Notice!
Once you change the IP Address of the unit, you cannot communicate with the device because the new IP Address is not recognizable.

11. Disconnect the **primary ARNI G2 from the PC**.
12. Connect the **secondary ARNI G2 to the PC**.

Notice!
The secondary ARNI G2 should be powered on first, and then the PC should be connected to the secondary ARNI G2. Once the network interface of the PC is configured properly, the configuration process can continue.

13. Click **Next**.
    The ARNI Configuration Tool attempts to connect to the secondary ARNI G2. A success message or a failed message appears.
14. Click **Next** to finish the ARNI G2 preparation.
    The Configuration window appears.
15. Click **Finish**.
    The Configuration window closes.
16. Attach the **configured ARNI G2 devices** to your production network and turn them on.

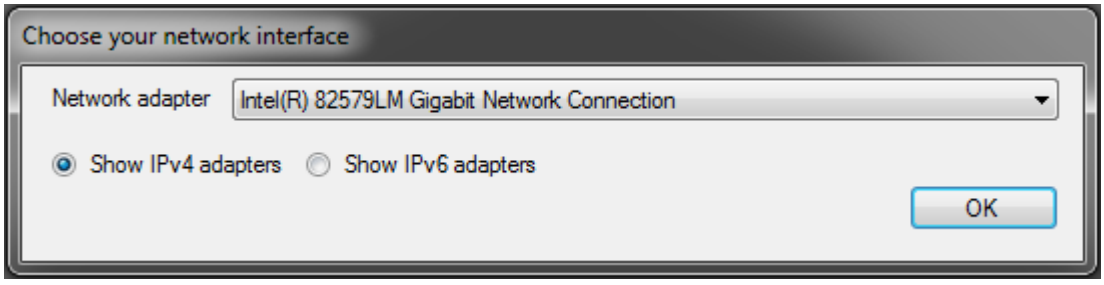
8.2 Single subnet ARNI G2: preparing offline configurations

The off-line preparation is used when you want to pre-configure the ARNI G2 device before connecting the device. This is a two (2) step process:
– Configure the ARNI G2
– Apply the configuration file to the ARNI G2 device you want to use
For more information, see Single subnet ARNI G2: applying offline configurations.

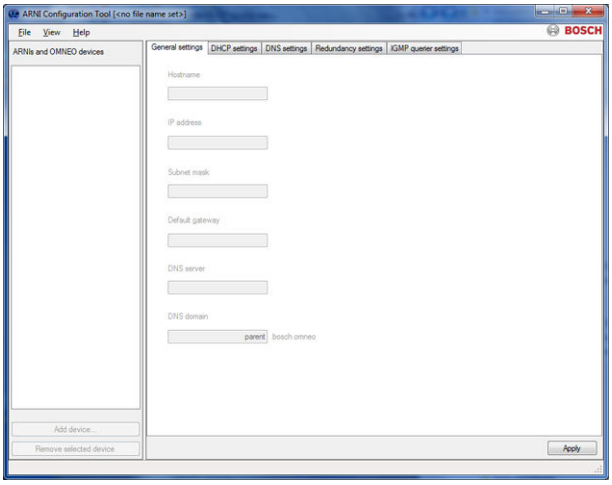
Notice!
Before using this tool, consult your network administrator about the design of your company's network. For more information, see Planning.

Prerequisites
– IP Subnet for system
– For non-redundant ARNI G2, IP Address
– For redundant ARNI G2, the shared IP Address and the physical IP Address of the primary and secondary ARNI G2
– IP Address pool range of the DHCP server in the subnet

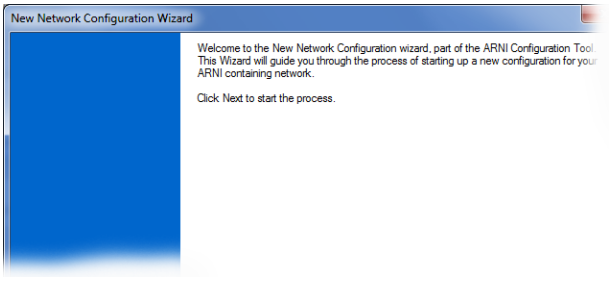
To prepare a single subnet off-line, do the following:
1. Open the **ACT** software.
   If you have more than one (1) network adapter on the PC, the Choose your network interface window appears. If there is only one (1) network adapter, this window does not appear.



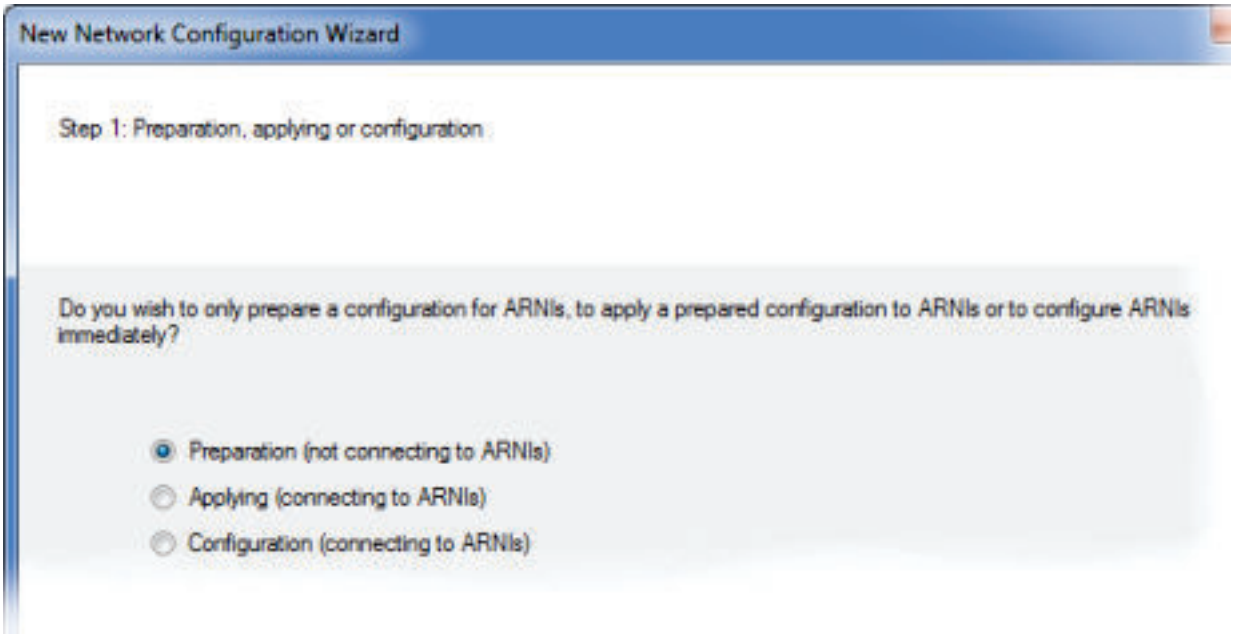
2. From the Network adapter drop down menu, select the **network adapter** you are using.
3. Select the **Show IPv4 adapters**.
4. Click **OK**.
   The ACT window appears.



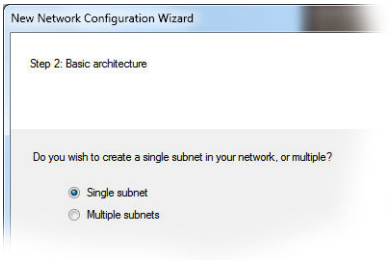
5. From the File menu, select **New Network Configuration**.
   The New Network Configuration Wizard appears.



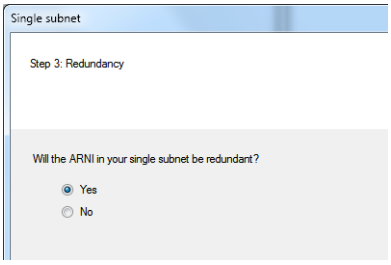
6. Click **Next**.
   The Step 1: Preparation, applying or configuration window appears.



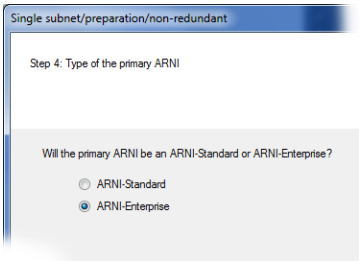
1. Select the **Preparation (not connecting ARNIs) radio button**.
2. Click **Next**.
   The Step 2: Basic architecture window appears.



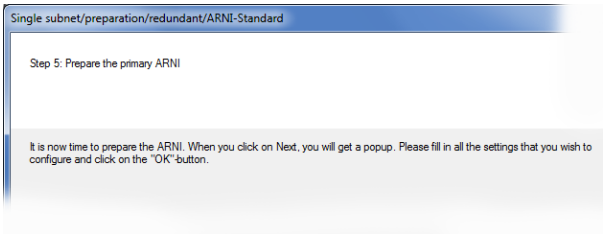
3. Select the **Single subnet radio button**.
4. Click **Next**.
   The Step 3: Redundancy window appears.



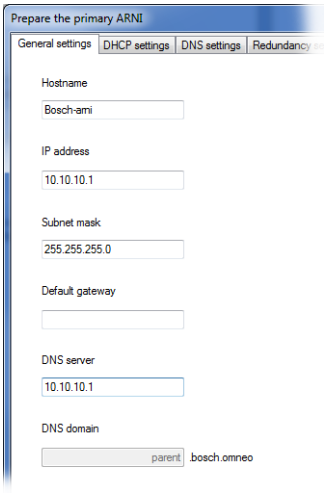
5. Select the **Yes radio button** to set up your single subnet as redundant.
   OR
   Select the **No radio button** to set up your single subnet without redundancy.
6. Click **Next**.
   The Step 4 Type of primary ARNI window appears.



7. Select the **ARNI-Standard radio button** to set the ARNI-S G2 as a primary ARNI G2.
   OR
   Select the **ARNI-Enterprise radio button** to set ARNI-E G2 as the primary ARNI G2.
8. Click **Next**.
   The Step 5: Prepare the primary ARNI window appears.



9. Click **Next**.
   The Prepare the primary ARNI window appears displaying the General settings page. For more information, see General settings, page 16.



- In the Hostname field, enter the **name of the ARNI G2**.
- In the IP address field, enter the **IP Address of the primary or non-redundant ARNI G2**.
- In the Subnet mask field, enter the **subnet mask address of the server where the ARNI G2 is located** (for example, 255.255.252.0).
- In the Default gateway field, enter **the default gateway where the ARNI G2 is located**, if applicable.

Notice!
If using a single subnet system, this field can be left empty. This is only used with a subnet with a gateway, allowing it to connect with other subnets.

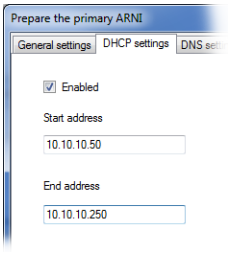
- In the DNS server field, enter the **address of the DNS Server**.

Notice!
The DNS server field must match the IP Address field above.

– In the DNS domain field, enter the **DNS domain of the ARNI**.

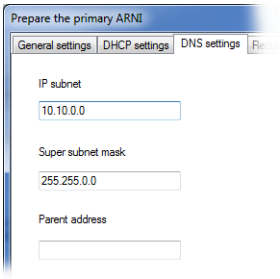
Notice!
The DNS domain field automatically populates with *parent* when configuring the primary ARNI device.

10. If using DHCP addressing, select the DHCP settings tab.
    The DHCP settings page appears. For more information, see DHCP settings, page 17.



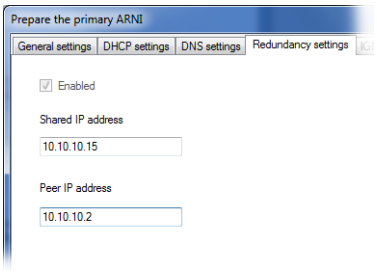
– Verify the **Enabled check box** is selected.
– In the Start address field, enter the **first address of the IP Address pool**.
– In the End address field, enter the **last address of the IP Address pool**.

11. If using a DNS server for addressing, select the **DNS settings tab**.
    The DNS settings page appears. For more information, see DNS Settings.



– In the IP subnet field, enter the **IP subnet of the DNS server**.
– In the Super subnet mask field, enter the **subnet mask of the DNS server**.
  For more information, see DNS settings, page 19.
– In the Parent address field, enter the **IP Address of the parent DNS server** to which the DNS server delegates requests it cannot handle itself.
  For more information, see DNS settings, page 19.

12. If using a redundant ARNI G2, select the **Redundancy setting tab**.

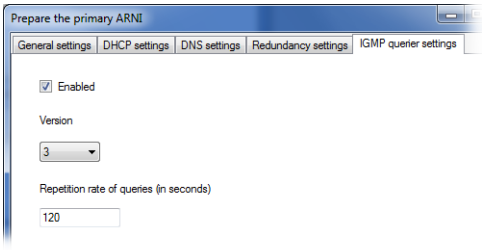


– Verify the **Enabled check box** is selected.

– In the shared IP Address field, enter the **IP Address that is shared between two (2) ARNI G2 devices**.

Notice!
This address cannot be part of the DHCP address pool if the DHCP server is enabled and is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or multi-cast (224.* - 239.*).

13. In the Peer IP address field, enter the **IP Address of the peer ARNI G2**. If you use IGMP, select the **IGMP querier setting tab**.
The IGMP querier settings window appears. For more information, see IGMP querier settings, page 21.



– Verify the **Enabled check box** is selected.
– From the Version drop down menu, select **the IGMP protocol version the querier uses**.
The version can only be 2 or 3.
– In the Repetition rate of queries (in seconds) field, enter the **time between regular query messages**.

14. Click **Apply**.
The Prepare the primary ARNI window closes and the successfully prepared ARNI message appears.

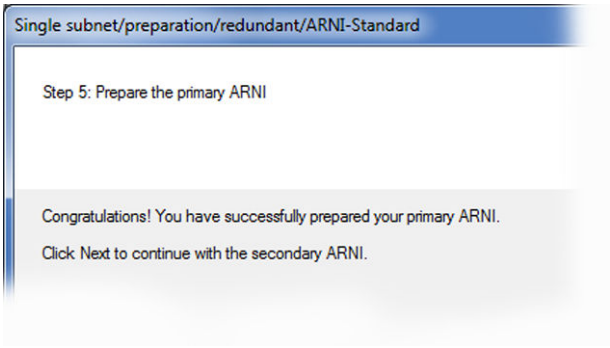


Figure 8.1:

15. Click **Next**, to prepare the secondary ARNI G2.
The secondary (redundant) ARNI preparation wizard begins. The wizard repeats steps 15 through 20 for the secondary ARNI G2.
OR
Click **Next** to finish the ARNI G2 preparation.
The Successfully prepared your primary ARNI message appears.
16. Click **Next**.
The Save As window appears so you can save your configuration files to use later.
17. In the file name field, enter a **recognizable file name**.
18. Click **Save**.
A success message appears.

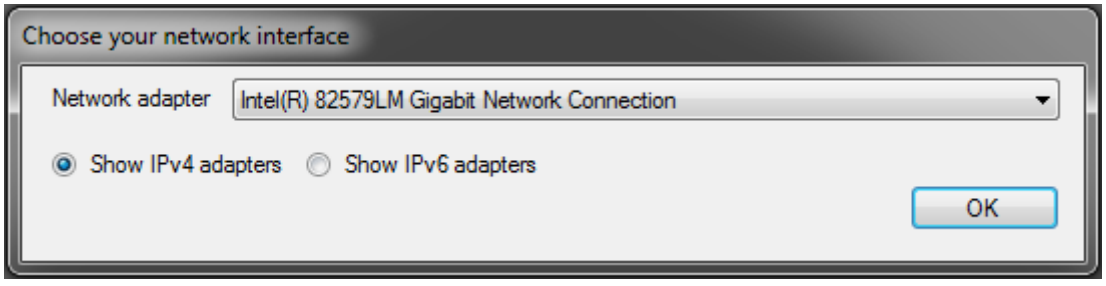
19. Click **Finish**.
    The wizard closes.
20. Complete *Single subnet ARNI G2: applying offline configurations, page 34* to complete the configuration.

8.3 Single subnet ARNI G2: applying offline configurations

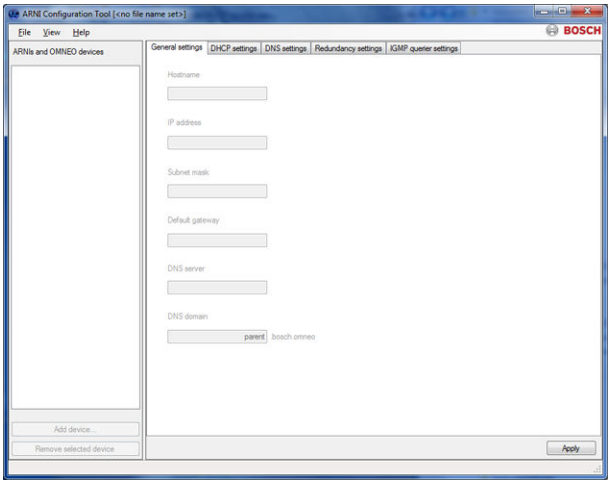
Notice!
Before using this tool, consult your network administrator about the design of your company's network. For more information, see Planning.

To **apply a pre-prepared configuration file**, do the following:

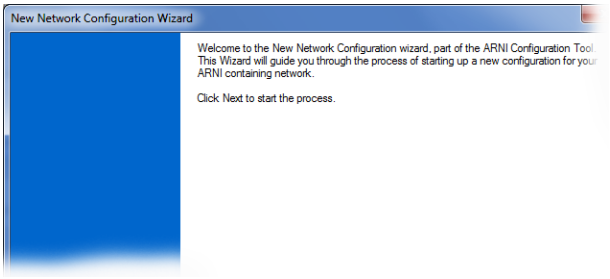
1. Power on the **primary ARNI G2**.
2. Connect the **PC to the primary ARNI G2, waiting until the network interface is configured** and the PC has a proper IP Address.
3. Open the **ACT software**.
   If you have more than one (1) network adapter on the PC, the Choose your network interface window appears. If there is only one (1) network adapter, this message does not appear.



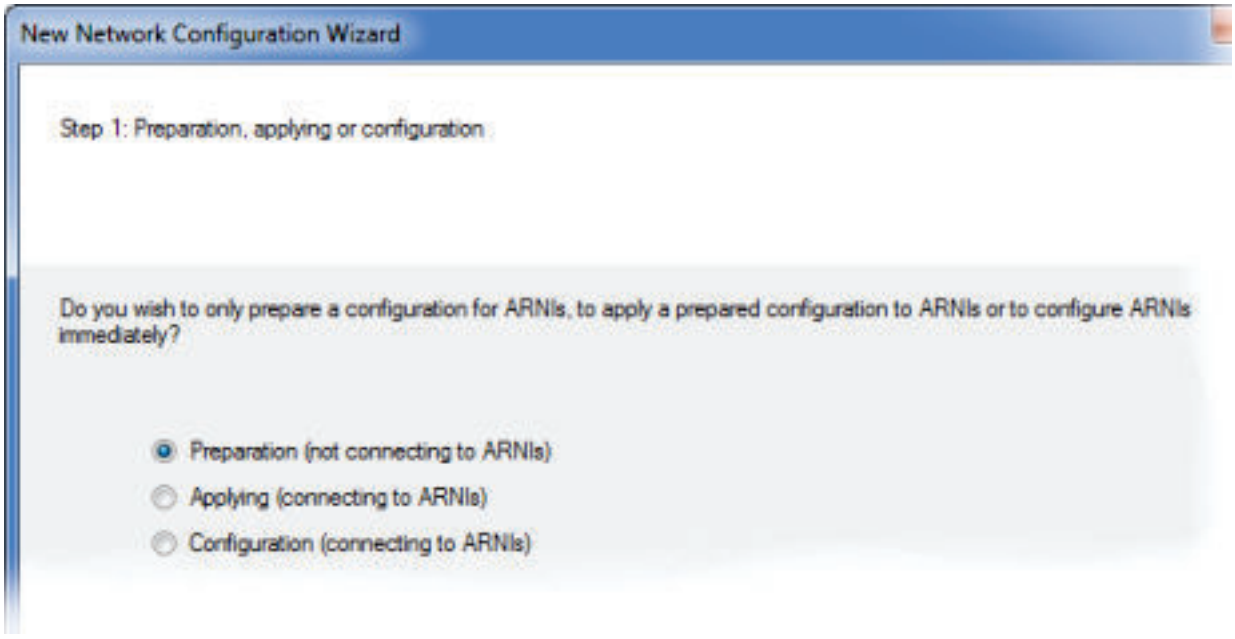
4. From the Network adapter drop down menu, select the **network adapter** you are using.
5. Select the **Show IPv4 adapters** radio button.
6. Click **OK**.
   The ACT window appears.



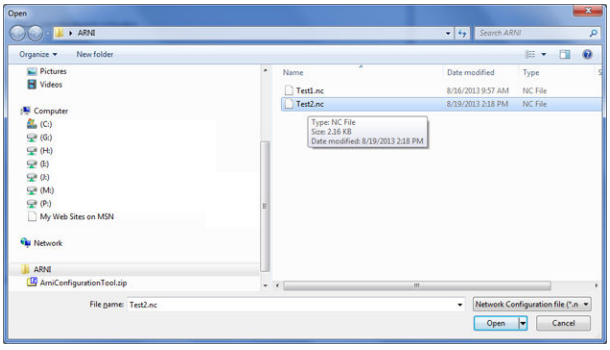
7. From the File menu, select **New Network Configuration**.
   The New Network Configuration Wizard appears.



8. Click **Next**.
   The Step1: Preparation, applying, or configuration window appears.

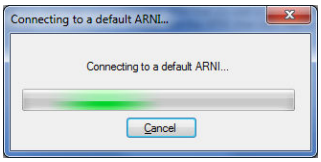


1. Select the **Applying (connecting to ARNIs) radio button**.
2. Click **Next**.
   A Select the prepared configuration file message appears.
3. Click **Next**.
   The folder on the network where the configuration files are stored appears.
4. Select the **configuration file** you want to apply to the connected ARNI G2 device.

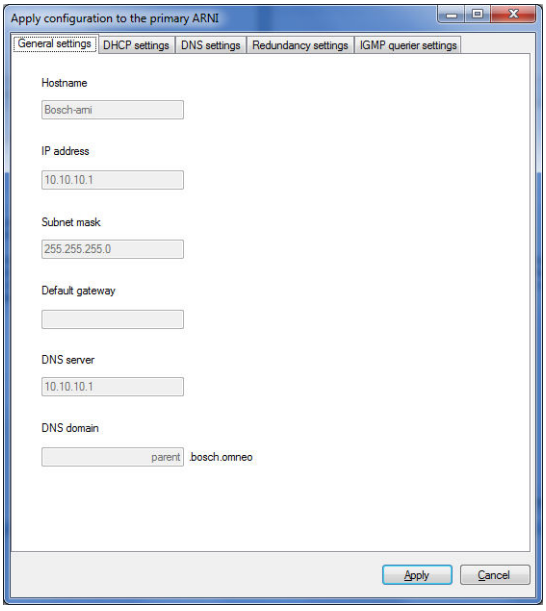


5. Click **Open**.
   The Step 3: Connect to retrieve the type of Primary ARNI message appears.
   Make sure to connect the indicated type of ARNI to the local PC (for example, ARNI-E or ARNI-S).

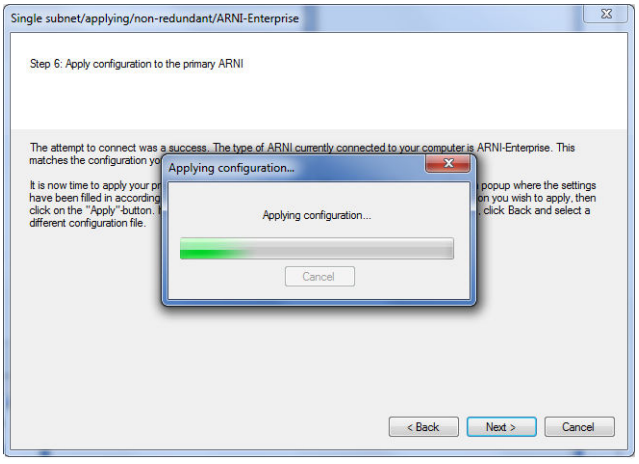
6. Click **Next**.
   The Connecting to a default ARNI message appears. And then, a message notifying you that a default ARNI has been detected and asks if you want to use this device appears.



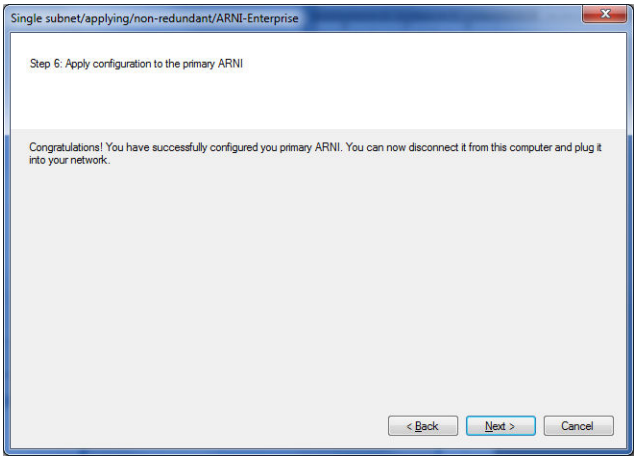
7. Click **Next**, to accept.
8. On the General Settings page, click **Apply**.



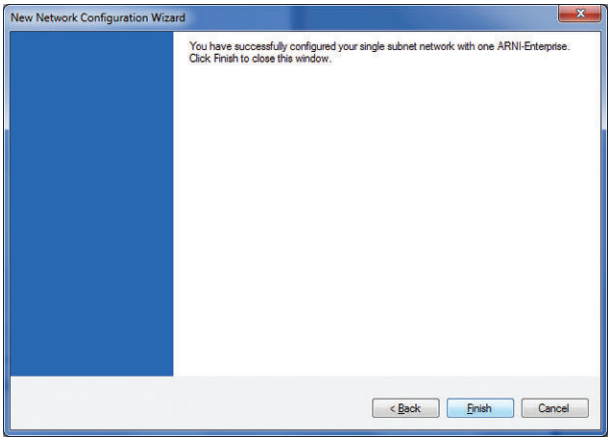
The Applying configuration window appears.



Once complete, a Congratulations message appears.



1. Click **Next**.
   The Success message window appears.



2. Click **Finish**.
   The Apply Wizard closes and you have applied the configuration to the selected ARNI G2.

8.4 Multiple subnet ARNI G2: configuration offline configurations

The **Off-line Configuration** is used to configure you ARNI G2 device on a staging network, then when you finish configuring the device moving it to your live network to start using it.

Notice!
Before using this tool, consult your network administrator about the design of your company's network. For more information, see Planning.

Prerequisites

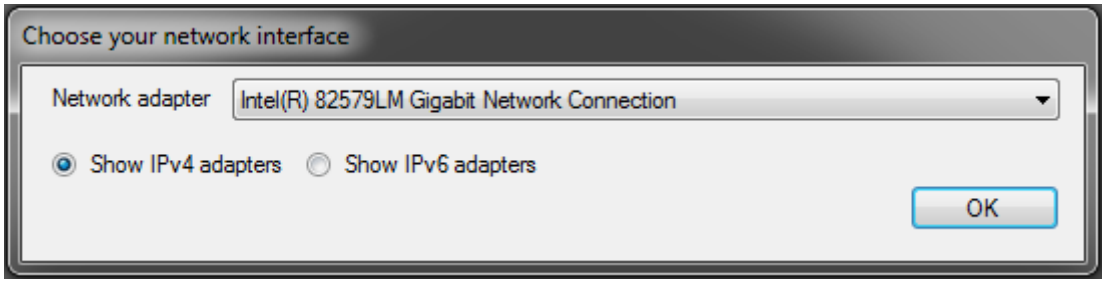
- The IP Subnet of the system
- The DHCP range of addresses for each subnet
- The Fixed IP Address for each non-redundant ARNI G2
  OR
  The Fixed IP Address for each redundant ARNI G2, the shared IP Address and the physical IP Address of the primary and secondary ARNI G2
- The Shared Address, if using a redundant system
- PC on which the ACT is installed and is configured to retrieve IP settings automatically (via DHCP)

Notice!
When using multiple subnets, a device residing in a subnet without an ARNI G2 must be addressed (manually or using DHCP) to communicate with the ARNI-E G2. In order for a subnet without an ARNI G2 device to work, the devices must have the following network setting:
• The DNS server MUST be the IP Address of the ARNI-E G2 (in case of a redundant ARNI-E G2, the shared IP Address is used).
• The DNS domain name MUST be parent.bosch.omneo.

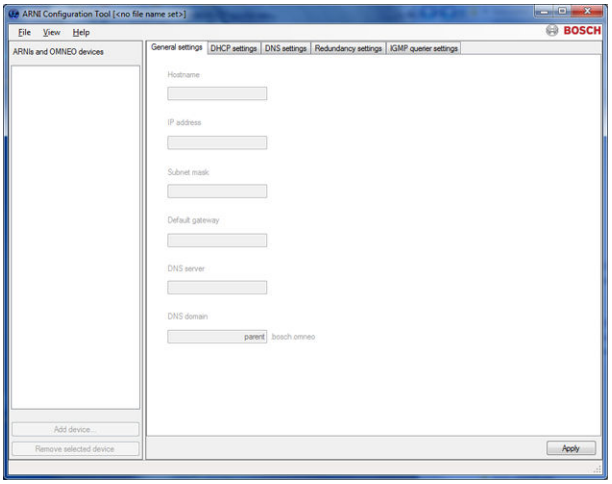
To **configure a multiple subnet ARNI G2 system off-line**, do the following:

Notice!
For a multi-subnet system you must have one (1) ARNI-E G2 and multiple ARNI-S G2 devices. Always configure the ARNI-E G2 device first, and then the subsequent ARNI-S G2 devices.

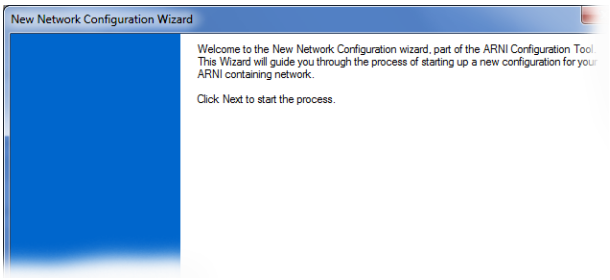
1. Power on the **primary ARNI-E G2**.
2. Connect the **PC to the ARNI-E G2** and wait until the network interface is configured (the PC has an IP Address).
3. Open **ACT**.
   If you have more than one (1) network adapter on the PC, the Choose your network interface window appears. If there is only one (1) network adapter, this window does not appear.



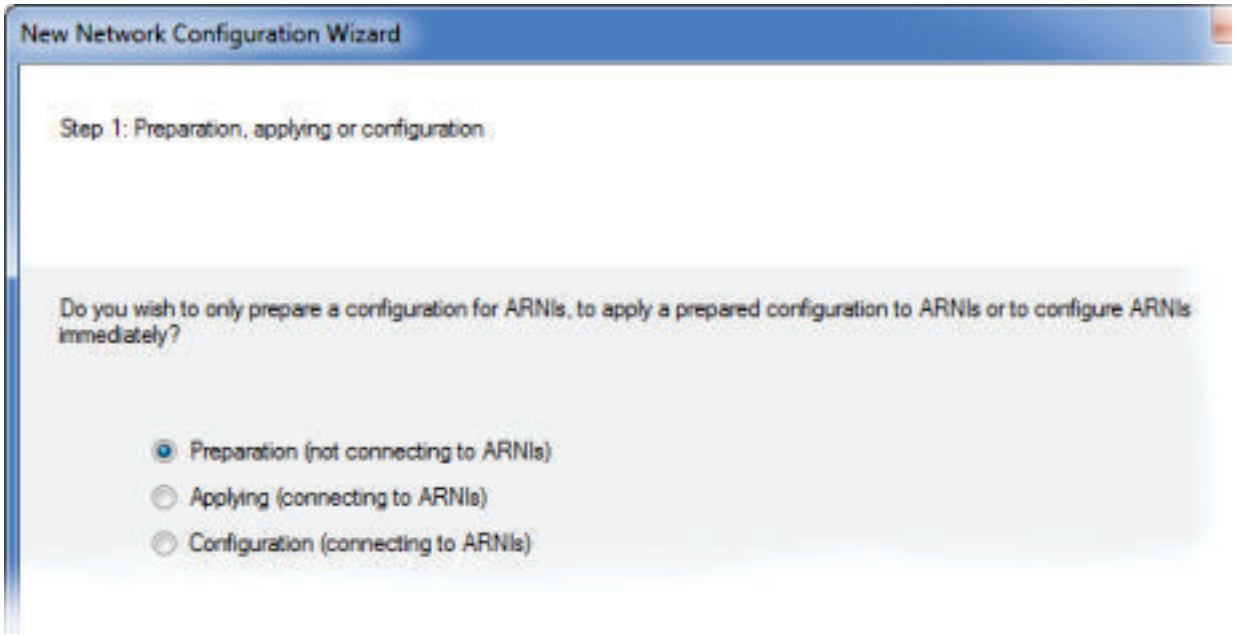
4. From the Network adapter drop down menu, select the **network adapter** you are using.
5. Select the **Show IPv4 adapters**.
6. Click **OK**.
   The ACT window appears.



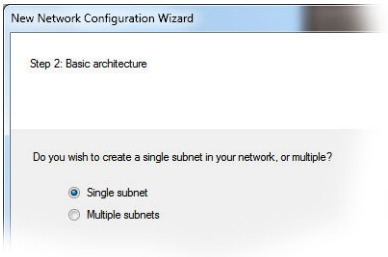
7. From the File menu, select **New Network Configuration**.
   The New Network Configuration Wizard appears.



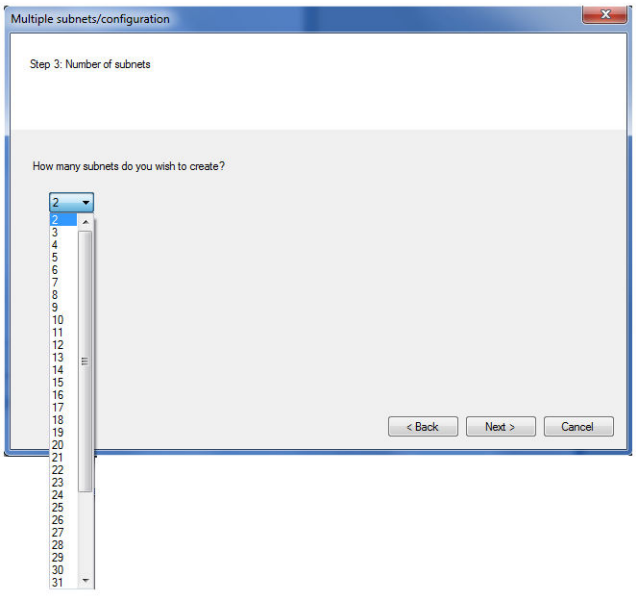
8. Click **Next**.
   The Step 1: Preparation, applying, or configuration window appears.



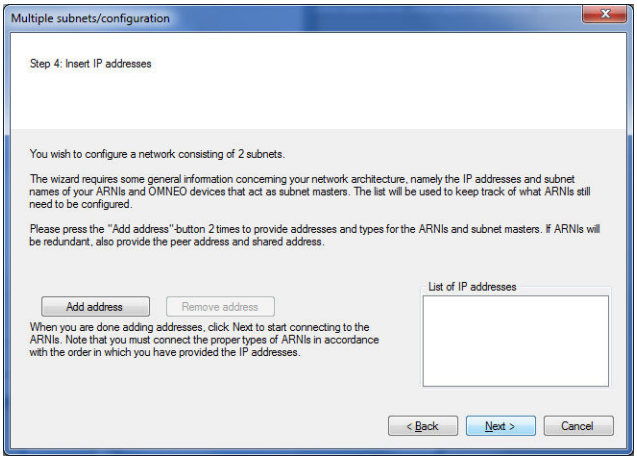
9. Select the **Configuration (connecting to ARNIs) radio button**.
10. Click **Next**.
    The Step 2: Basic architecture window appears.



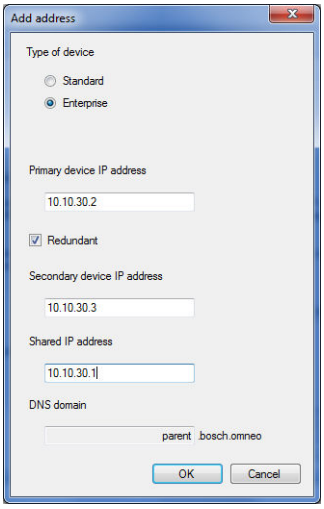
11. Select the **Multiple subnets radio button**.
12. Click **Next**.
    The number of subnets window appears.



13. From the drop down menu, select the **number of subnets** you want to set up.
14. Click **Next**.
    The Insert IP Addresses window appears.



15. Click the **Add address button**.
    The Add address window appears.



16. Select the **Enterprise radio button** to set up an ARNI-E G2 subnet.
    OR
    Select the **Standard radio button** to set up and ARNI-S G2 subnet.
17. In the Primary device IP address field, enter the **IP Address of the primary device**.

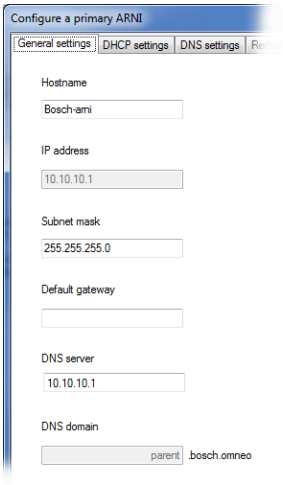
Notice!
For a non-redundant system, you do not need to fill out any more fields.

18. Select the **Redundant** check box to configure redundancy only if the specific ARNI G2 being configure is redundant.
19. In the Second device IP address field, enter the **IP Address of the secondary device**.
20. In the Shared IP address field, enter **the IP Address to be shared between the primary and secondary device**.
21. In the DNS domain field, verify it reads **parent** if configuring an ARNI-E G2 device subnet.
    OR
    Enter a **recognizable domain name** for the subsequent subnets (for example, Subnet_2)
22. Click **OK** to accept the modifications made.
    OR
    Click **Cancel** to close the window without applying the changes.
    The Add address window closes and the address configuration appears in the List of IP Address field.
23. Repeat **steps 14 through 21** for each subnet you want to add to the system.
24. Once finished setting up the subnets, click **Next**.
    The message "the ARNI Configuration Tool will try to connect to the ARNI devices" appears.
25. Click **Next**.
    A message window appears showing the connection progression. A success message appears.
    OR
    A failure message appears.
26. Click **Next**.
    The Configuration window appears in which you can configure the settings of the specific ARNI G2 you just connected to.

For each device, do the following:

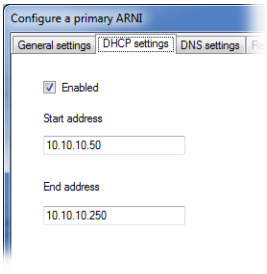
Notice!
The tool cycles through the devices in the order they were added; meaning the ARNI-E G2 followed by the ARNI-S G2.
Remember, you must connect ARNI devices one at a time, to avoid IP address conflicts.

1. On the General Settings page, make the necessary **modifications for configuring the ARNI G2** for your system.



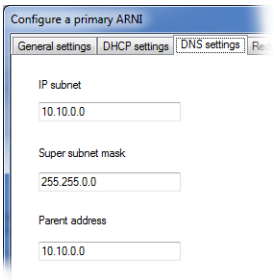
- In the Hostname field, enter the **name of the ARNI G2**.
- In the IP address field, enter the **IP Address of the primary or non-redundant ARNI G2**.
- In the Subnet mask field, enter the **subnet mask address where the ARNI G2 is located** (for example, 255.255.255.0).
- In the Default gateway field, enter the **default gateway where the ARNI G2 is located**, if applicable.
  If using a single subnet system, this field can be left empty. Only when using a subnet that has a gateway is it necessary to allow it to connect with other subnets.
- In the DNS server field, enter the **address of the DNS Server**.
  The DNS server must match the IP Address field.
- In the DNS domain field, enter the **DNS domain of the ARNI G2**.

2. If using DHCP address, select the **DHCP settings tab**.
   The DHCP settings page appears. For more information, see DHCP settings, page 17.



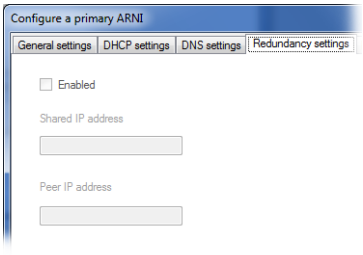
- Verify the **Enabled check box** is selected.
- In the Start address field, enter the **first address of the IP Address pool**.
- In the End address field, enter the **last address of the IP Address pool**.

3. If using a DNS server for addressing, select the DNS settings tab.
   The DNS settings page appears. For more information, see DNS settings, page 19 DNS settings, page 19.



- In the IP subnet field, enter the **IP subnet of the DNS server**.
- In the Super subnet mask field, enter the **subnet mask of the DNS server**. For more information, see DNS settings.
- In the Parent address field, enter the **IP address of the parent DNS server to which the DNS server delegates requests it cannot handle itself**. For more information, see *DNS settings, page 19*.

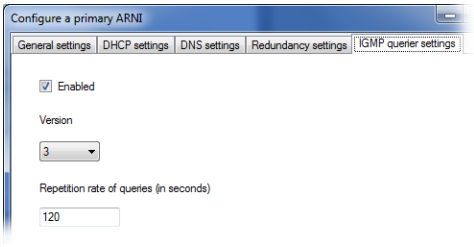
4. If using a redundant ARNI G2, select the **Redundancy settings tab**.
   The Redundancy settings window appears.



- Verify the **Enabled check box** is selected.
- In the shared IP address field, enter the **IP Address shared between ARNI G2 devices**.
- In the Peer IP address field, enter the **IP Address of the peer ARNI G2**.

Notice!
This address cannot be part of the DHCP address pool if the DHCP server is enabled and is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or multi-cast (224.* - 239.*).

5. If you use IGMP, select the **IGMP querier settings tab**.
   The IGMP querier settings window appears.



- Verify the **Enabled check box** is selected.
- From the Version drop down menu, select the **IGMP protocol version** the querier uses. The version can only be 2 or 3.

– In the Repetition rate of queries (in seconds) field, enter the **time between regular query messages** (in seconds).

6. Click **Apply**.
   The modifications you have made are applied to the ARNI G2.

Notice!
Once you change the IP Address of the unit, you may not be able to communicate with the device because the new IP Address is not recognized on the network.

Finish configuring the multi-subnet ARNI G2 system

1. Once you are finished modifying the configuration, power off the **ARNI G2**.
   Once the modifications are complete, the ARNI Configuration Tool prompts you to save the configuration.
2. Enter a **meaningful configuration file name**.
3. Click **Save**.
4. Attach the **configured ARNI G2** to your production network and turn them on.

8.5 Multiple subnet ARNI G2: preparing offline configurations

The offline preparation is used when you want to pre-configure the ARNI G2 device before connecting to the device. This is a two (2) step process:

– Prepare ARNI G2 configuration
– Apply the configuration

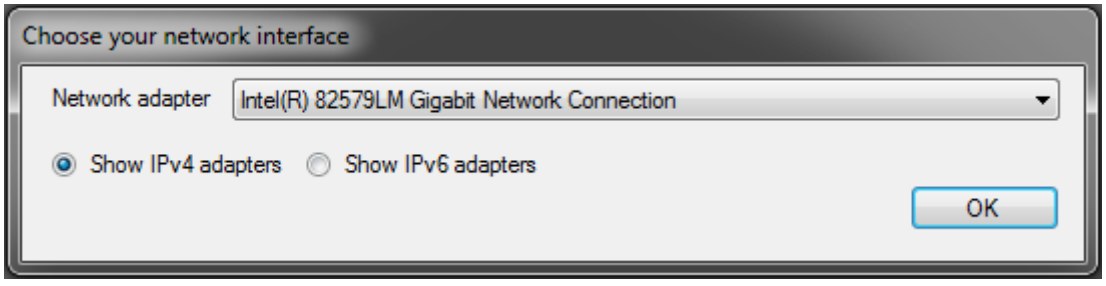
Notice!
Before using this tool, consult your network administrator about the design of your company's network. For more information, see Planning.

Prerequisites

– The IP Subnets of the system
– The DHCP range of addresses for each subnet
– The Static IP Address for each non-redundant ARNI G2
  OR
  The Static IP Address for each redundant ARNI G2, the shared IP Address and the physical IP Address of the primary and secondary ARNI G2
– The Shared Address, if using a redundant system

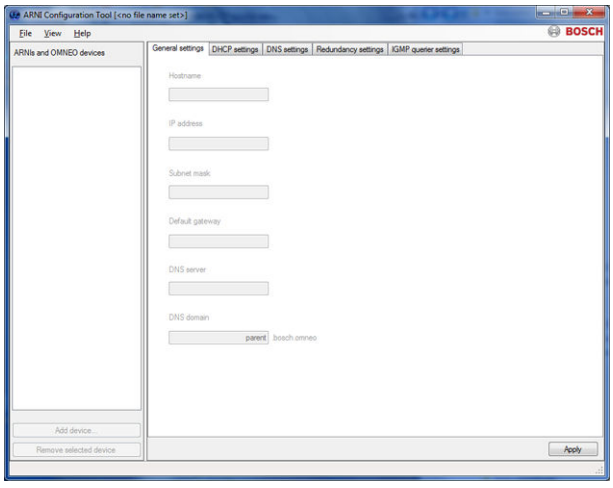
To **prepare a multi subnet ARNI G2 off-line**, do the following:

1. Open the **ACT software**.
   If you have more than one (1) network adapter on the PC, the Choose your network interface window appears. If there is only one (1) network adapter, this window does not appear.

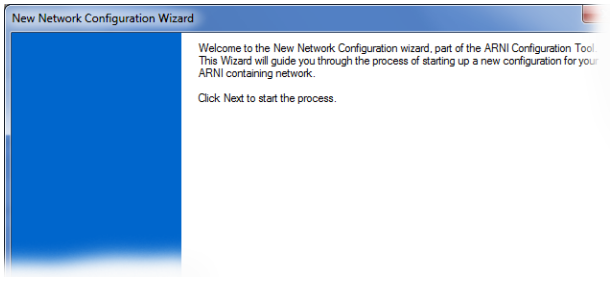


2. From the Network adapter drop down menu, select the **network adapter** you are using.
3. Select the **Show IPv4 adapters radio button.**

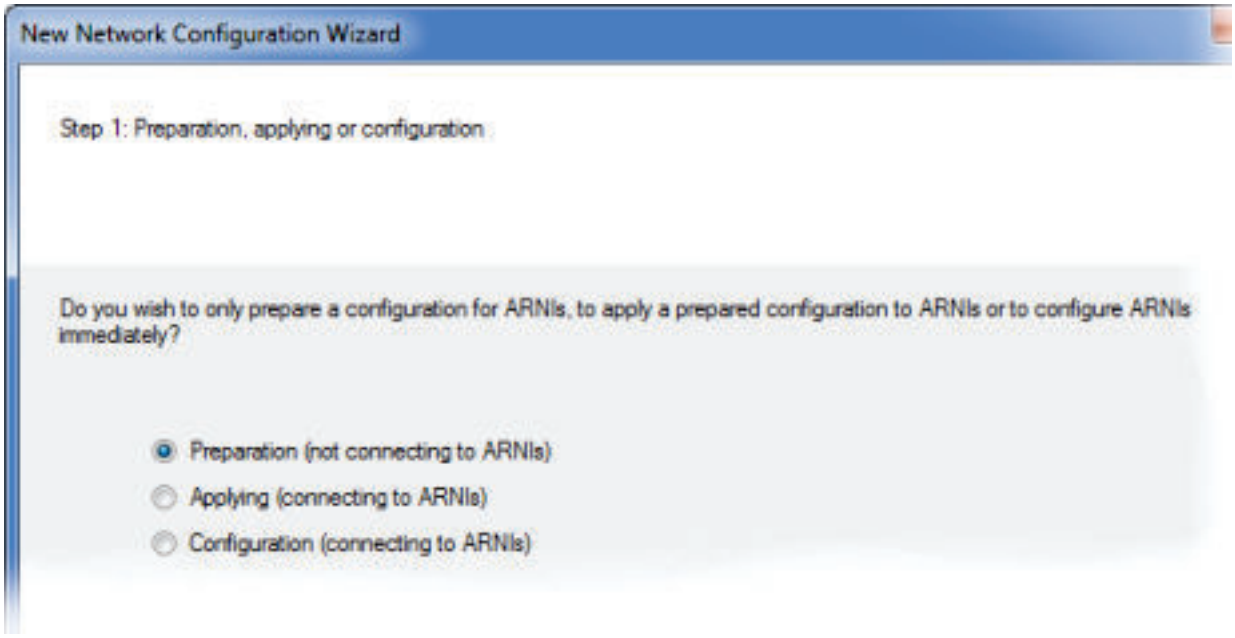
4. Click **OK**.
   The ACT window appears.



5. From the File menu, select **New Network Configuration**.
   The New Network Configuration Wizard appears.

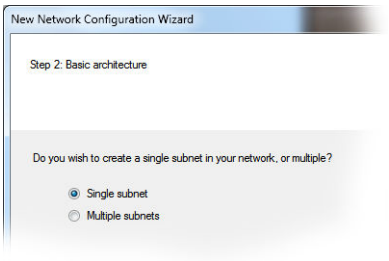


6. Click **Next**.
   The Step 1: Preparation, applying, or configuration window appears.

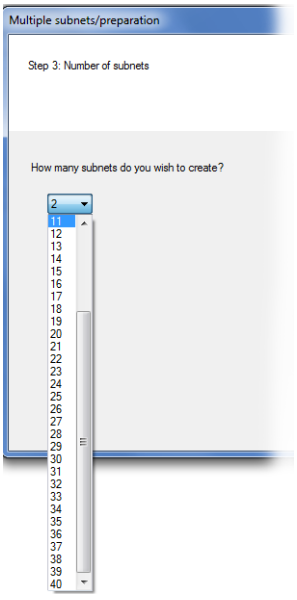


1. Select the **Preparation (not connecting to ARNIs) radio button**.

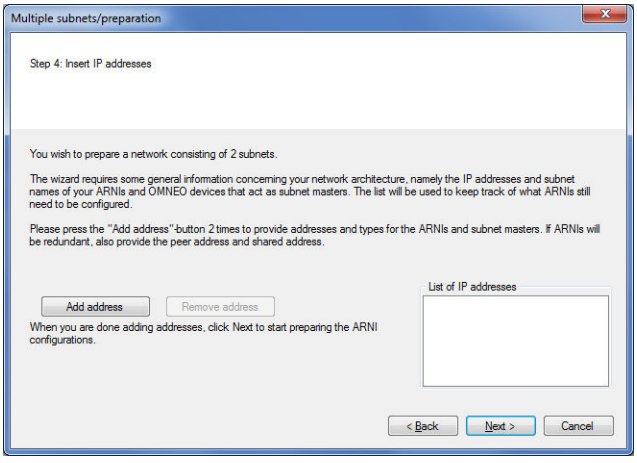
2. Click **Next**.
   The Step 2: Basic architecture window appears.



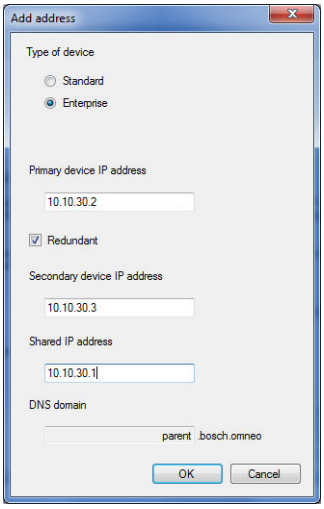
3. Select the **Multiple subnets radio button**.
4. Click **Next**.
   The Multiple subnets/preparation window appears.



5. From the drop down menu, select the **number of subnets** you planned to set up.
6. Click **Next**.
   The Step 4 Insert IP Addresses window appears.



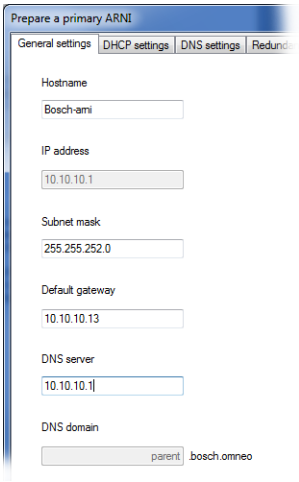
7. Click the **Add address button**.
   The Add address window appears.



8. Select the **Enterprise radio button** to set up an ARNI-E G2 subnet.
   OR
   Select the **Standard radio button** to set up an ARNI-S G2 subnet.
9. In the Primary device IP address field, enter the **IP Address** of the primary ARNI G2.
10. Select the **Redundant** check box to configure redundancy.
11. In the Secondary device IP address field, enter the **IP Address** of the secondary ARNI G2.
12. In the Shared IP address field, enter the **IP Address** to be shared between the primary and secondary device.
13. In the DNS domain field, verify it reads **parent**, if configuring and ARNI-E G2 subnet.
    OR
    In the DNS domain field, enter a **recognizable domain** name for the subsequent subnets.
14. Click **OK** to accept the modifications made.
    OR
    Click **Cancel** to close the window without applying the changes.
    The Add address window closes and the address configuration appears in the List of IP Address field.
15. Repeat **steps 14 through step 20** for each subnet you want to add to the system.
16. Once finished setting up the subnets, click **Next**.
17. Click **Next**.
    The wizard guides you through any more ARNI configurations you may have, based on the addresses you added earlier.
18. Click **Next**.

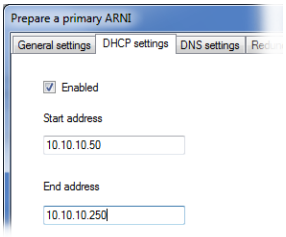
For each device, do the following:

1. On the General settings page, make the **necessary modifications** for configuring the ARNI G2 for your system. For more information see *General settings, page 16*.



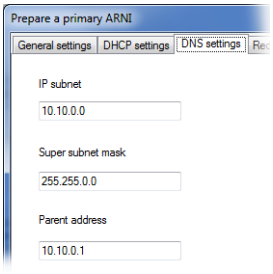
- In the Hostname field, enter the **name of the ARNI G2**.
- In the IP address field, enter the **IP Address of the primary or non-redundant ARNI G2**.
- In the Subnet mask field, enter the **subnet mask address where the ARNI G2 is located** (for example, 255.255.252.0).
- In the Default gateway field, enter **the default gateway where the ARNI G2 is located**, if applicable.
  If using a single subnet system, this field can be left empty. Only when using a subnet that has a gateway is it necessary to connect with other subnets.
- In the DNS server field, enter the **address of the DNS Server**.
  The DNS server field must match the IP address field.
- In the DNS domain field, enter the **DNS domain of the ARNI G2**.
  The DNS domain field automatically populates with parent when configuring the primary ARNI G2 device.

2. If using DHCP addressing, select **the DHCP settings tab**.
   The DHCP settings page appears. For more information, see DHCP settings, page 17.



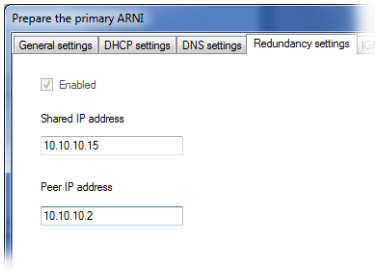
- Verify the **Enabled check box** is selected.
- In the Start address field, enter the **first address of the IP Address pool**.
- In the End address field, enter the **last address of the IP Address pool**.

3. If using a DNS server for addressing, select the **DNS settings tab**.
   The DNS settings page appears. For more information, see DNS settings, page 19.



– In the IP subnet field, enter the **IP subnet of the DNS server**.
– In the Super subnet mask field, enter the **subnet mask of the DNS server**.
– In the Parent address field, enter the **IP Address of the parent DNS server** to which the DNS server delegates requests it cannot handle itself.

4. If using a redundant ARNI G2, select the **Redundancy setting tab**. For more information, see *Redundancy settings, page 20*.

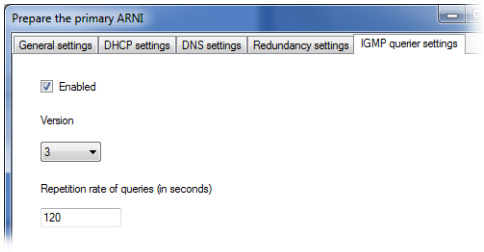


– Verify the **Enabled check box** is selected.
– In the shared IP Address field, enter the **IP Address that is shared between two (2) ARNI G2 devices**.

Notice!
This address cannot be part of the DHCP address pool if the DHCP server is enabled and is not allowed to be 0.*, loopback (127.*), link-local (169.254.*), or multi-cast (224.* - 239.*).

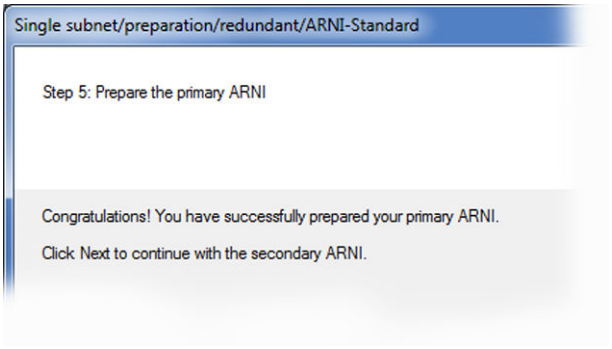
– In the Peer IP address field, enter the **IP Address of the peer ARNI G2**.

5. If you use IGMP, select the **IGMP querier setting tab**.
The IGMP querier settings window appears. For more information, see IGMP querier settings, page 21.



– Verify the **Enabled check box** is selected.
– From the Version drop down menu, select **the IGMP protocol version the querier uses**.
The version can only be 2 or 3.
– In the Repetition rate of queries (in seconds) field, enter the **time between regular query messages**.

6. Click **Apply**.
The Step 5: Prepare the primary ARNI window closes and the successfully prepared ARNI message appears.



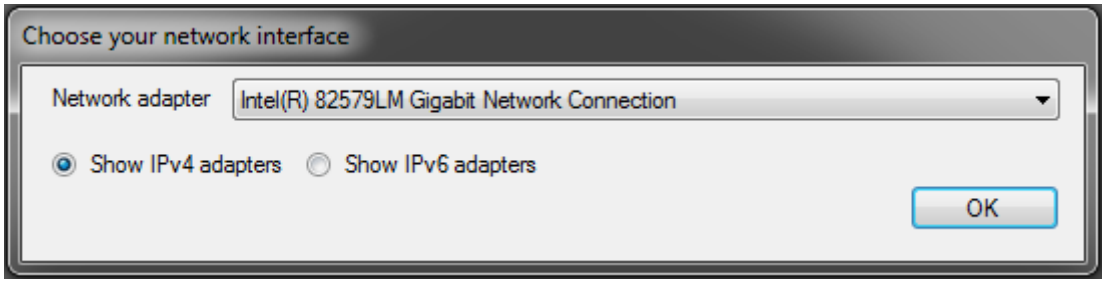
7. Click **Next** to prepare the secondary ARNI G2.
   The secondary (redundant) ARNI preparation wizard begins. The wizard repeats steps 1 through 6 for the secondary ARNI G2.
   OR
   Click **Next** to finish the ARNI G2 preparation.
   The Successfully prepared your primary ARNI message appears.
8. Click **Next**.
   The Save As window appears so you can save your configuration files to use later.
9. In the file name field, enter an **appropriate file name**.
10. Click **Save**.
    A success message appears.
11. Click **Finish**.
    The wizard closes.

Complete *Multiple subnet ARNI G2: applying offline configurations, page 50* to complete the configuration.

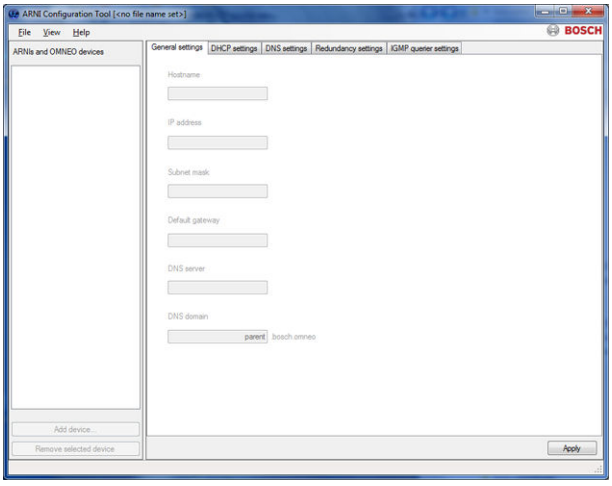
8.6 Multiple subnet ARNI G2: applying offline configurations

To **apply a prepared configuration file**, do the following:

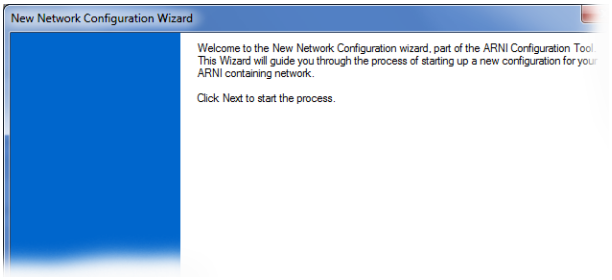
1. Power on the **ARNI-E G2 (primary device)**.
2. Connect the **PC to the ARNI-E G2** and wait until the network interface is configured (the PC receives an IP Address).
3. Open the **ACT software**.
   If you have more than one (1) network adapter on the PC, the Choose your network interface window appears. If there is only one (1) network adapter, this window does not appear.



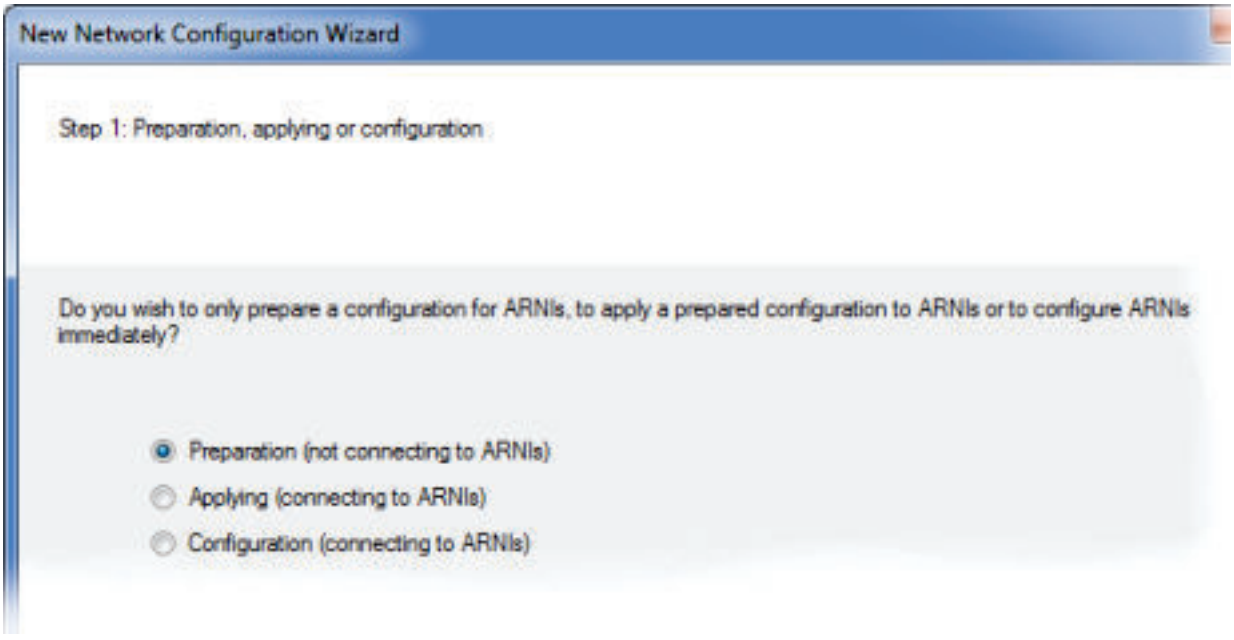
4. From the Network adapter drop down menu, select the **network adapter** you are using.
5. Select the **Show IPv4 adapters** radio button.
6. Click **OK**.
   The ACT window appears.



7. From the File menu, select **New Network Configuration**.
   The New Network Configuration Wizard appears.

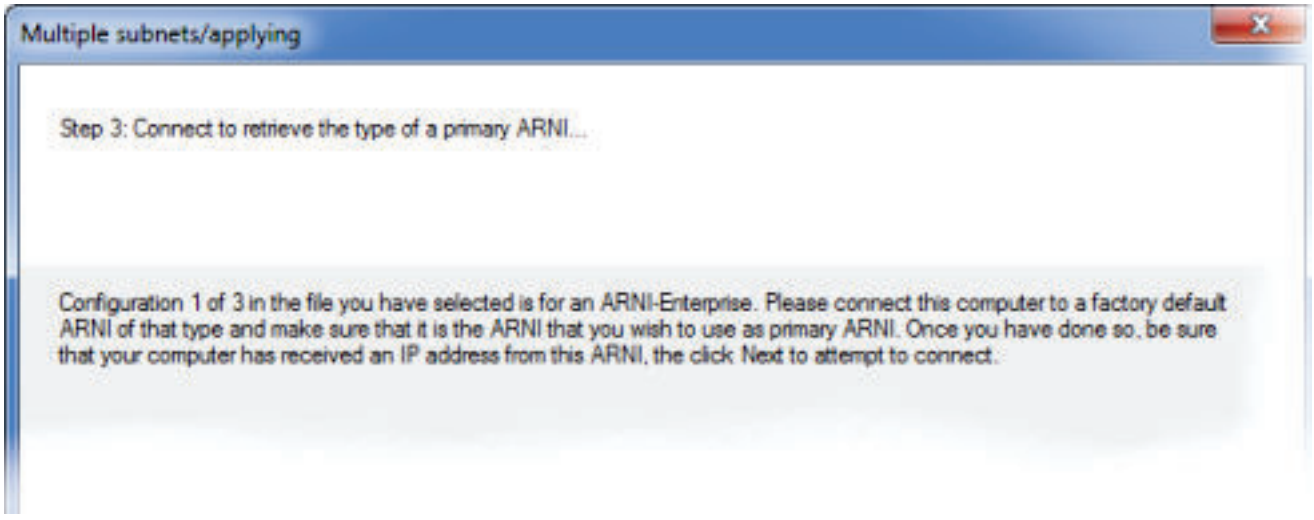


8. Click **Next**.
   The Step 1: Preparation, applying or configuration window appears.

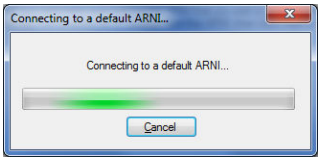


1. Select the **Applying (connecting to ARNIs) radio buttons**.
2. Click **Next**.
   A Select the prepared configuration file message appears.

3. Click **Next**.
   The folder on the network where the configurations are stored appears
4. Select the **configuration file** you want to apply to the ARNI G2 device.
5. Click **Open**.
   The Step 3: Connect to retrieve the type of primary ARNI message appears.



6. Click **Next**.
   The Connecting to the default ARNI G2 message appears. And then, a message notifying you that a default ARNI G2 has been detected and do you want to use this device appears.



7. Click **Next** to accept.
8. On the General settings page, click **Apply**.
   A progression window appears while the file is being applied to the ARNI-E G2 (primary device). Once the file is done a success message window appears.
9. Click **Next**.
   A success message appears for configuring the primary ARNI G2.
10. Click **Next**.
    A message saying the second device is ready to be configured appears.

Notice!
The secondary ARNI G2 should be powered on first, and then the computer should be connected to the secondary ARNI G2. Once the network interface of the computer is configured properly again, the process can continue.

11. Power on the **ARNI-S G2**.
12. Connect the **ARNI-S G2 to the PC**.
13. Click **Next**.
    The ACT software attempts to connect to the ARNI-S G2. Once the ACT software connects, a message window declaring the attempt to connect was a success appears.
14. Click **Next**.
    The General settings page appears.

15. On the General settings page, click **Apply**.
    A progression window appears while the file is being applied to the ARNI-S. Once the file is done, a success message window appears.
16. Click **Finish**.
    The window closes.

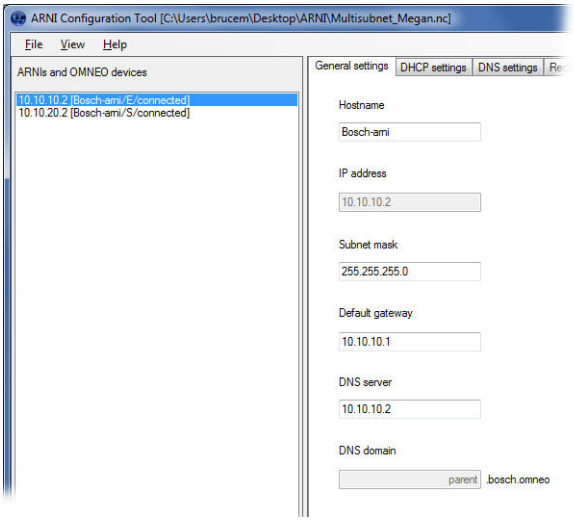
8.7 Online configuration

Online configuration is used to make modifications to the ARNI G2 network configuration while running in the network infrastructure. Remember, all ARNI G2 devices in this mode have their own IP Addresses, where in offline modes they have all have the same factory default.

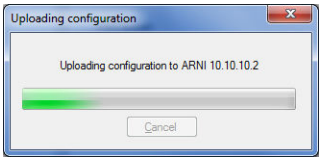
Caution!
You are working on a *live* network, be conscious the changes you make to the ARNI G2 device may impact devices within the subnet where the ARNI G2 device resides.

To **modify an ARNI G2 configuration online**, do the following:

1. Open the **ACT software**.
   If you have more than one (1) network adapter on the computer, the Choose your network interface window appears. If there is only one (1) network adapter, this window does not appear.
2. From the File menu, select **Open**.
   The network folder where the ARNI G2 configuration files reside appears.
3. Select the **configuration file** you want to open.
4. Click **Open**.
   The configuration file opens and the ARNI G2 device connects with the network.



5. Make **modifications** to the different settings, as necessary.
6. Click **Apply**.
   The Uploading configuration to ARNI <IP Address> message appears.



The configuration modification is uploaded to the ARNI G2.

9 Troubleshooting

9.1 Restore ARNI G2 to factory default state

A **restore** re-images the ARNI G2, meaning it reinstalls the operating system and the ARNI G2 firmware with the settings set to default.

To **restore the ARNI G2 device to the factory default state**, do the following:

1. Power off the **ARNI G2 device by pressing the power button on the front panel**.
2. Insert the **supplied USB drive into USB port** on the front of the ARNI G2 device.

1. Power on the **ARNI G2 device**.
   The restore begins.

Notice!
The restore can last up to 20 minutes. Once the restore is complete, the ARNI G2 powers off.

2. Remove the **USB drive** from the USB port.
3. Power on the **ARNI G2 device**.
   The ARNI G2 device is restored to the factory default state with the default software. Note, a software update may be required via the Firmware Update Tool. See , Upgrade the ARNI G2 device firmware, page 61.

9.2 Reset ARNI G2 to factory default setting

A **reset** is used to reset the ARNI G2 device to its default settings (for example, IP Address, 192.168.0.1).

There are two (2) ways to perform a reset:

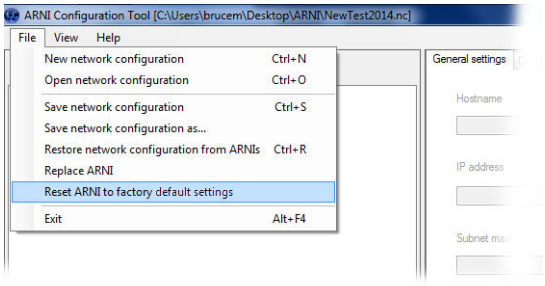
– Using the ACT software
– Using the supplied USB drive

9.2.1 Reset ARNI G2 to factory default setting using the software

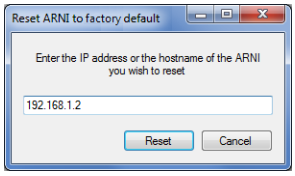
To **reset the ARNI G2 device to the factory defaults setting using ACT software**, do the following:

1. Open the **ACT Software**.

2. From the File menu, select **Reset ARNI to factory settings**.
   The Reset ARNI to default window appears.



3. In the IP Address field, enter **the IP address of the ARNI G2 device you want to reset**.



4. Click **Reset**.
   The ARNI G2 resets to the factory defaults setting.

9.2.2 Reset ARNI G2 to factory default setting using the USB drive

A **Reset** adjusts the ARNI G2 configuration settings to its default settings. Unlike the restore, a reset does not reload the operating system.

Caution!
It is important to verify the USB drive is not inserted into the ARNI device before you power on the unit. Powering on the unit with the USB stick installed initiates a system restore. A system restore can last up to 20 minutes.

To **reset the ARNI G2 device to factory default settings**, do the following:

1. Verify the **ARNI G2 device** is powered on.
2. Insert the **supplied USB drive into USB port 3** on the front of the ARNI G2 device.
   The USB drive starts to run the reset action. The reset takes 10–20 seconds. Once the reset finishes the ARNI G2 device powers off.

1. Remove the **USB drive from the USB port**.

2. Turn on the **ARNI G2 device**.
   The ARNI G2 is reset to factory defaults.

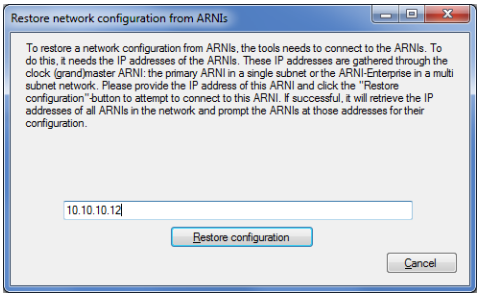
10 Maintenance

10.1 Reconstruct system configurations

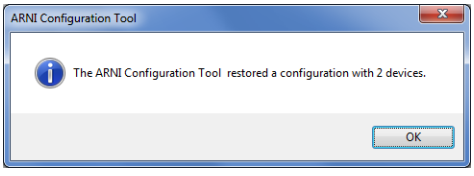
Reconstruction of a system configuration is only necessary when the original configuration file is lost or becomes corrupt. Using the ARNI G2 device, a configuration file can be reconstructed for you to restore.

To **reconstruct a system configuration file**, do the following:

1. Open the **ACT software**.
   If you have more than one (1) network interface on the PC, the Choose your network interface window appears. If there is only one (1) network interface, this window does not appear.
2. From the Network adapter drop down menu, select the **network adapter** you are using.
3. Select the **Show IPv4 adapters radio button**.
4. Click **OK**.
   The ACT window appears.
5. Open a **network configuration**.
6. From the File menu, select **Restore network configuration from ARNI G2 devices**.
   The Restore network configuration from ARNIs window appears.



7. In the IP field, enter the **IP Address of the ARNI G2 device** (for multiple subnets, ARNI-E G2 or for single subnet, the primary ARNI G2 device) you want to restore.
8. Click the **Restore configuration button**.



9. Click **OK**.
   When ACT is closed, a window appears asking if you want to Save the configuration changes.
10. Click **Yes**.

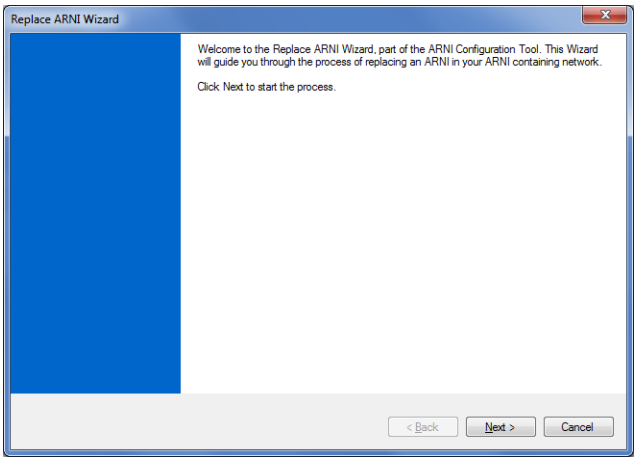
10.2 Replace an ARNI G2

To **replace an ARNI G2**, do the following:

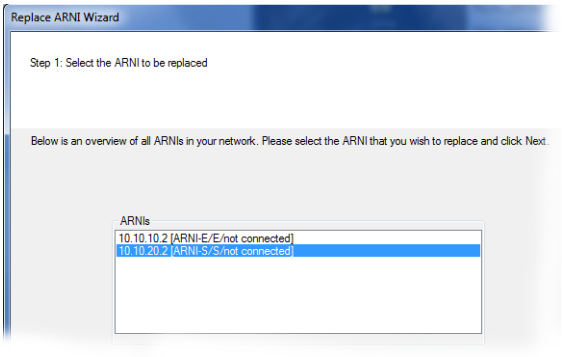
Notice!
The replacement ARNI G2 must have the factory default configuration.

1. Open the **ACT software**.
2. Open a **network configuration**.

3. From the File menu, select **Replace an ARNI G2**.
   The Replace an ARNI wizard appears.



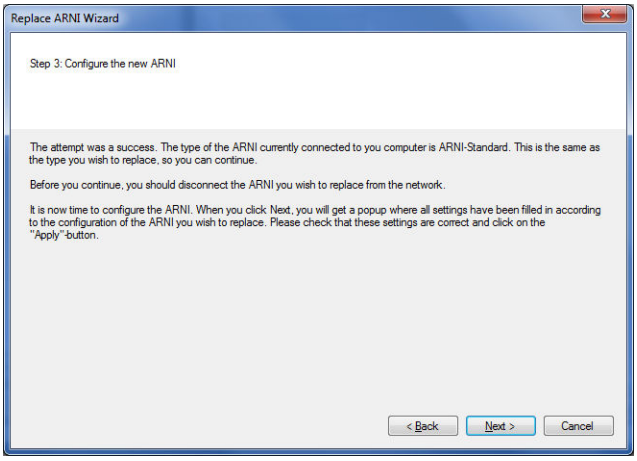
4. Click **Next**.
   The Step 1: Select the ARNI to be replaced window appears.
5. From the ARNIs field, select the **ARNI G2** you want to replace.



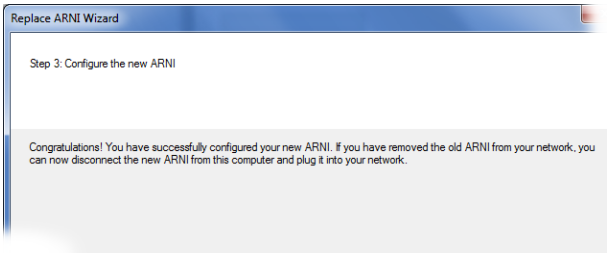
6. Click **Next**.
   The Step 2: Connect to retrieve the type of the ARNI... window appears.
7. Verify the **ARNI G2 you are replacing is disconnected from the PC running the ACT software**.
8. Connect an **ARNI G2 device with a factory default setup to the PC running the ACT software**.

Notice!
Verify the default ARNI G2 and the PC running the ACT software can communicate with each other. For more information, see *Connectivity, page 15*.

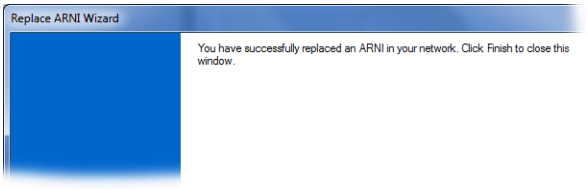
9. Click **Next**.
   A trying to connect message appears. And then the message attempt was a success appears.



10. Click **Next**.
    The Configuration window appears.
11. Verify the **Configuration Information is correct**.
12. Click **Apply**.
    The ACT software applies the configuration to the connected ARNI G2 device. And a message appears indicating the configuration of the ARNI G2 was a success. You can now move the ARNI G2 to the existing network.



13. Click **Next**.
    A message displaying you have successfully replace an ARNI in your network appears.

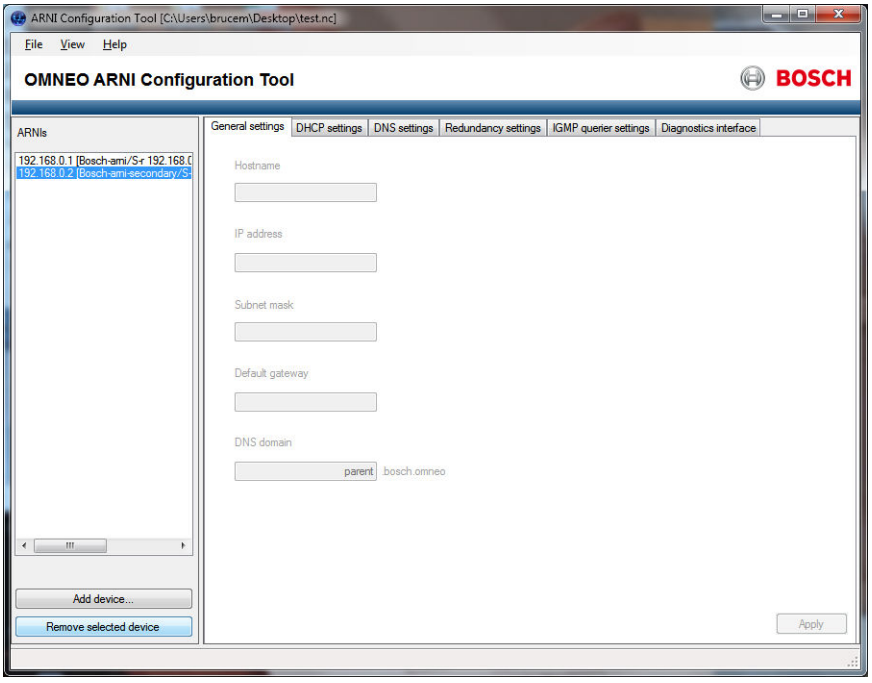


14. Click **Finish**.
    The Replace ARNI Wizard closes.

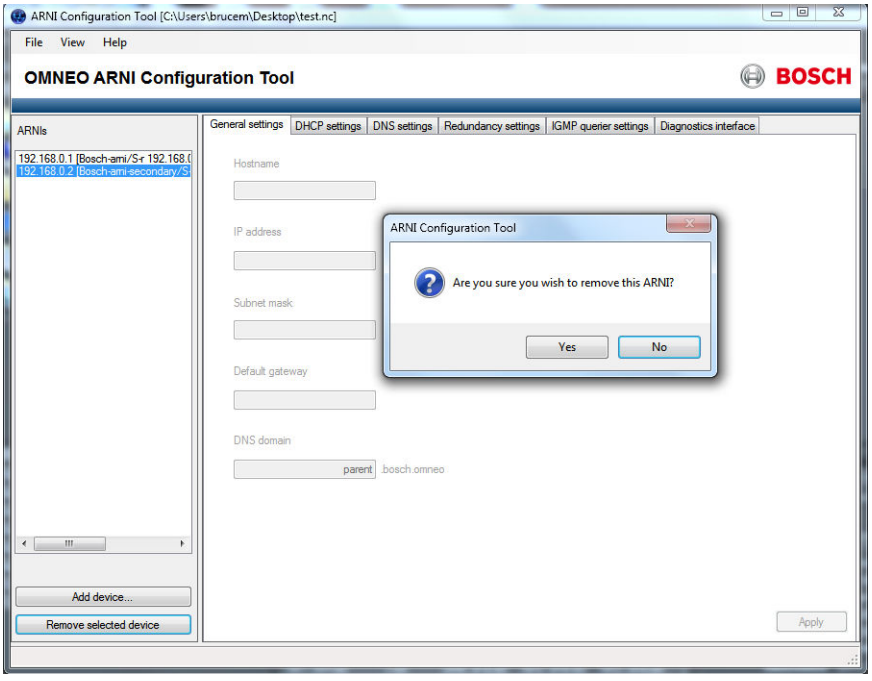
10.3 Remove an ARNI G2

To **remove an ARNI G2 from a system**, do the following:

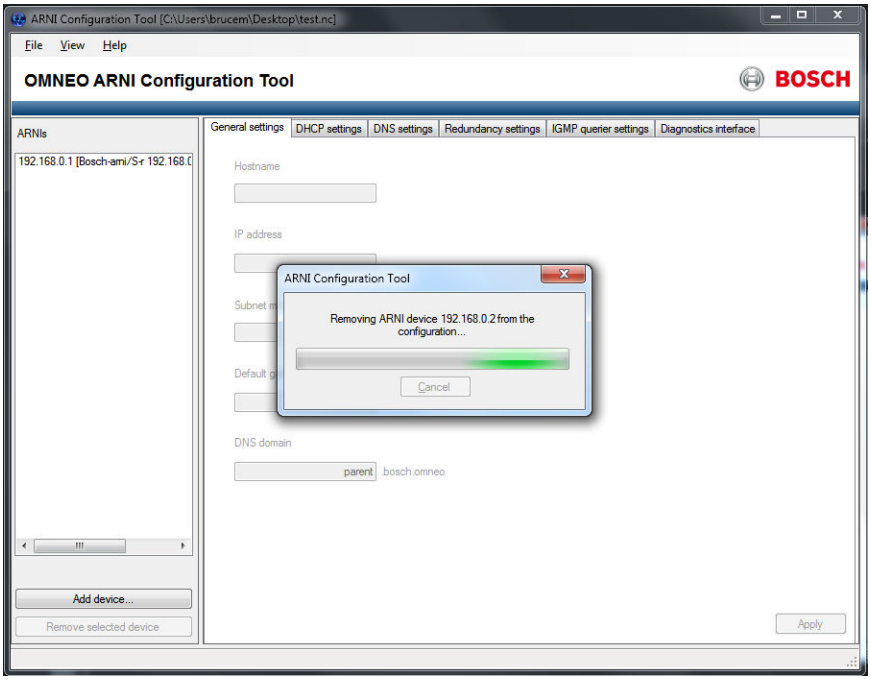
1. From the left navigation panel, select the **ARNI device** you want to remove.



2. From the bottom of the left navigation panel, click the **Remove selected device button**.
   A message appears verifying the removal of the device.



3. Click **Yes**.
   A message window appears showing the device being removed.



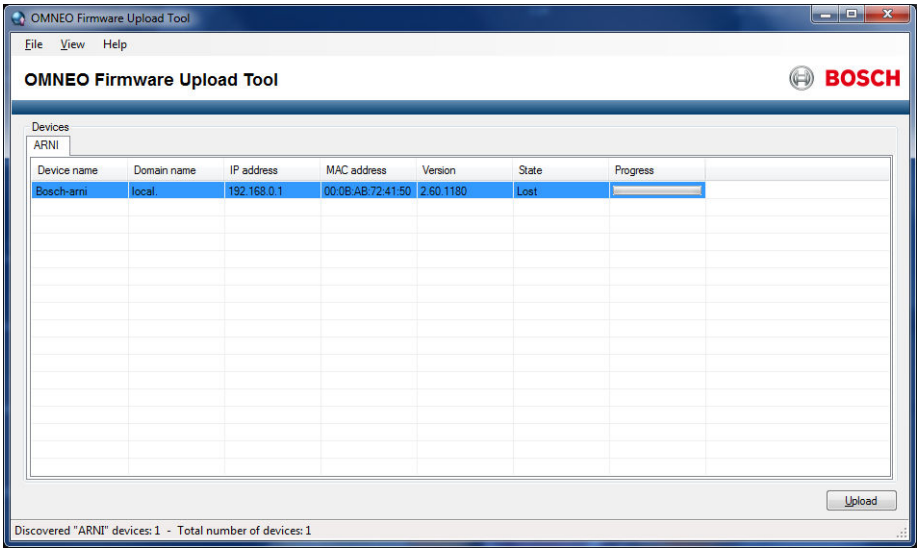
Once the window closes, the ARNI G2 device is removed from the left navigation pane.

10.4 Upgrade the ARNI G2 device firmware

To **upgrade the ARNI G2 device firmware**, do the following:

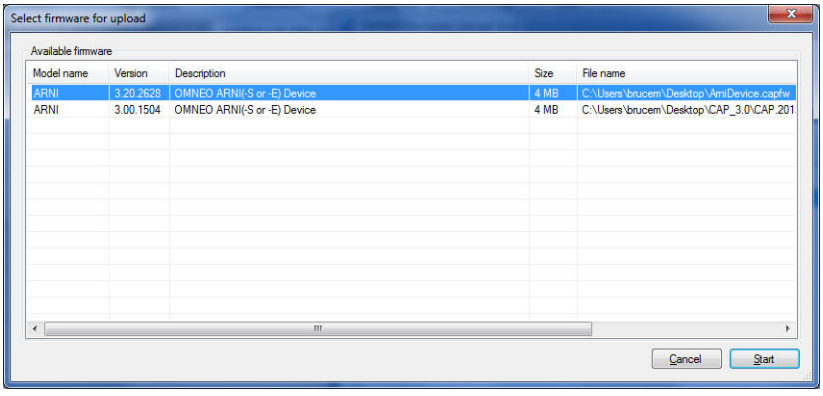
Notice!
Before starting, verify the ARNI G2 firmware is present on the PC running the firmware upgrade tool by running the ARNI Installer: SetupOMNEOArniFirmware64.msi or SetupOMNEOArniFirmware.msi (32-bit system).

1. Start the **Firmware Upgrade Tool**.



Notice!
If you did not change the location of the ARNI G2 firmware after running the installer, skip to Step 7.

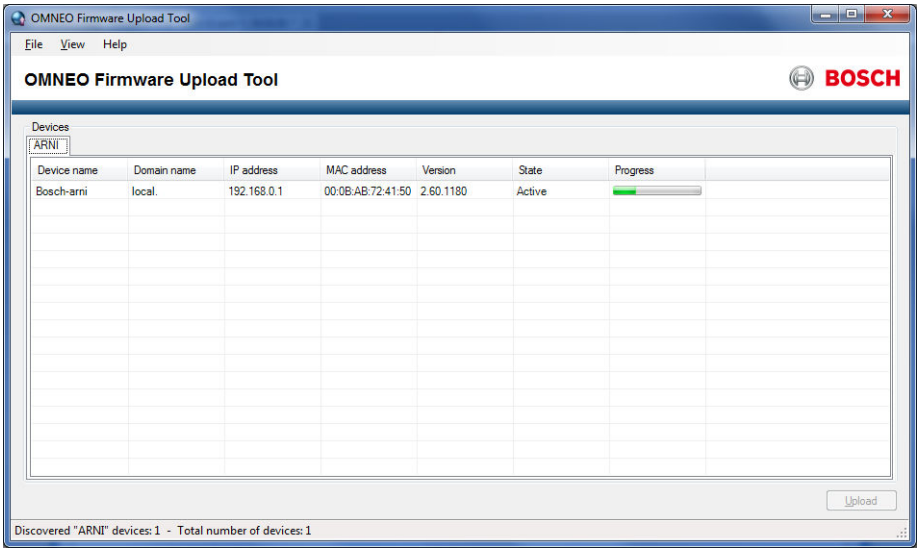
2. From the File menu, select **Options**.
   The Firmware Upload Tool Options window appears.
3. Click **Change**.
   The Browse for Folder window appears.
4. Browse to find the **directory** containing the ARNI G2 firmware you want to use for the upgrade.
5. Click **OK**.
   The Browse for Folder window closes and the Image folder field populates with the file path.
6. Click **OK**.
7. From the main window, select the **ARNI G2 device** you want to upgrade.
   The Upload button in the lower-right corner becomes active.
8. Click the **Upload button**.
   The Select firmware for upload window appears.



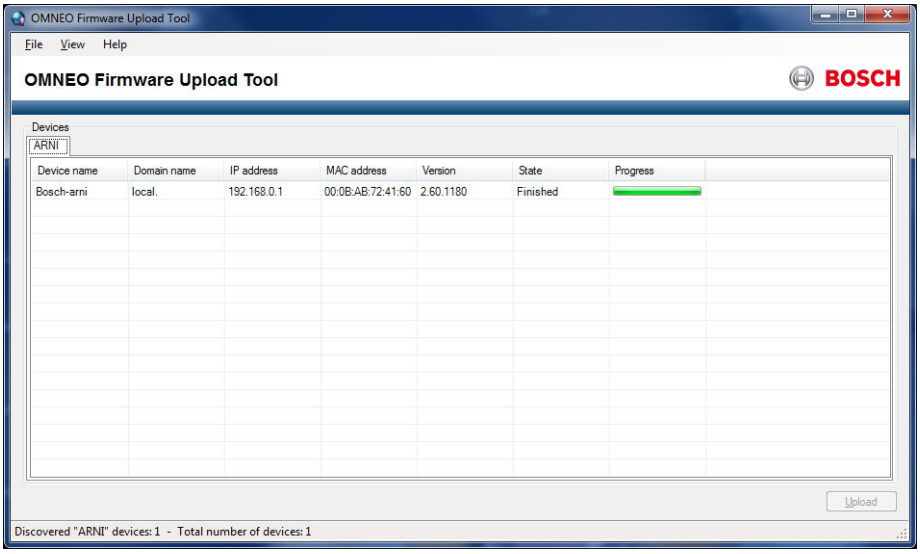
9. Select **the firmware version** you want to upload.

Notice!
For the latest firmware version, go to www.rtsintercoms.com.

10. Select **Start**.
    The firmware starts uploading to the ARNI G2 device. You can watch the progress using the progression bar in the main Firmware Upload Tool window.



Once the upload is done, Finished appears in the Status column and the version updates.



11 Specifications

Processor System	
CPU	Intel Celeron™ Processor J1900 Quad Core 2.0 GHz SoC
Frequency L2 Cache	2.0 GHz 2 MB
System Chipset	7th Gen. Intel Graphic Core
BIOS	AMI EFI
Memory	
Type	DDR3L
Capacity	2GB
Socket	1 x 204-pin SO-DIMM
Ethernet	
LAN 1	10/100/1000Mbps Ethernet controller
I/O Interface	
Serial Interface	1 x RS-232/422/485 (BIOS selectable)
USB Interface	2 x USB ports & 1 x USB 3.0
Storage	
2.5” Drive Bay	32GB SSD
Power Requirement	
Power Input Voltage	12VDC
Power Adaptor	AC to DC, DC 12V/36W
Power Consumption	
Typical	15 Watt
Maximum	30 Watt
Mechanical	
Construction	Aluminum housing
Dimensions (W x H x D)	133.8mm x 43.1mm x 94.2mm (5.27in. x 1.7in. x 3.71in.)
Weight	1.30 lb (0.45 kg)
Environment	
Operating Temperature	-4°F–140°F (-20°C–60°C) - With extended temperature SSD/ mSATA/RAM with 0.7m/s airflow The power supply has an upper limit of 131°F (55°C)
Storage Temperature	-40°F–185°F (-40°C–85°C)
Relative Humidity	95% @ 40°C (non-condensing)

Certifications	
EMC	CE/FCC Class A, CCC, BSMI
Safety	UL, CCC, BSMI, CB

12 OMNEO system overview

See also

– *ARNI configuration tool introduction, page 16*

12.1 Switched network

A **switched network** is any network using network switches to transfer data/audio packets from the sender to the recipient. Nodes or node points on the subnet may be connected to each other using a switch operation at Layer 2, the data link layer of the OSI (Open Systems Interconnection) models of computer networking. The data link layer ensures error-free and reliable data packet transfer between network nodes which conserves bandwidth.

Requirements

The minimum requirements for a switched network are:

Cabling:

– 100Mbps minimum, however, 1Gbps full-duplex is highly recommended(only node ports should be 100Mb)

– Proper cables used. See Recommended minimum cables to use with OMNEO

Switches:

– Switch ports at least 1Gbps full-duplex (only node ports should be 100Mb)

– Hardware switching capabilities (no switching in software)

Quality of Service:

– DiffServ (Differentiated Services) QoS (Quality of Service) with four (4) or more output queues with strict priority packet scheduling

– DSCP (Differentiated Services Code Point) value has six (6) bits (0–63)

Common Configuration of Switches:	
	• Highest priority queue holds all packets ≥DSCP 56
	• Next queue holds all packets ≥ DSCP 46
	• Next queue holds all packets ≥ DSCP 8

– Decimal value is calculated to binary and place in first six (6) bits

– IPv4 header contains QoS, switches must be configured as such:
  – Enable strict priority scheduling for all output queues
  – Ensure DSCP value 56 is part of the highest priority output queue (OMNEO PTP traffic)
  – Ensure DSCP value 46 is part of the medium priority output queue (OMNEO audio traffic)

Cable Type	Description
CAT-5e	This type of cable is used in structured cabling for computer networks such as Ethernet. The cable standard provides performance of up to 100MHz and is suitable for 10BASE-T, 100BASE-TX (fast Ethernet), and 1000BASE-T (Gigabit Ethernet).
CAT-6/6e	This type of cable is standard for Gigabit Ethernet and other network physical layers that is backward compatible with the CAT-5/5e, CAT-3 cable standards. Compared with CAT-5 and CAT-5e, CAT-6 features more stringent specifications for crosstalk and system noise. The cable standard provides performance of up to 250MHz and is suitable for 10BASE-T, 100BASE-TX (fast Ethernet), 1000BASE-T/ 1000BASE-TX (Gigabit Ethernet), and 10GBASE-T (10 Gigabit Ethernet)
CAT-7	This type of cable is used as a cabling infrastructure for 1000BASE-T (Gigabit Ethernet or GbE) and 10GBASE-T (10 Gigabit Ethernet, or 10GbE) networks. The CAT-7 standard provides performance of up to 600MHz (1000MHz for the CAT-7a, or Augmented CAT-7 standard) and can be used up to a maximum length of 100 meters. CAT-7 cables are able to achieve higher performance than preceding Ethernet standards, such as CAT-5, CAT-5e, and CAT-6 by requiring each of its twisted wire pairs to be fully shielded.

Table 12.1: Recommended minimum cables to use with OMNEO

12.2 Switched network types

12.2.1 Small system

Small system

- Up to 128 OMNEO Nodes
- System may not require any servers
  - No DHCP server required, local link is used
  - No DNS server required, mDNS (Multicast DNS) is used
  - No PTP server required, runs automatically
- Daisy chain of nodes limited to 20, including the root switch

Considerations

- Assume multicast traffic is sent to the complete subnet
- Know the channel limits of your network

- Design your network towards the weakest link. The maximum amount of traffic should not exceed 70% of the bandwidth of the weakest link
- A clear understanding of how the system is used and how audio is configured and routed is needed when the system is being designed
- Bandwidth of the other traffic should be known and estimated

Notice!
Using a separate VLAN for OMNEO nodes can ensure there is no other traffic. Be sure to account for the control traffic needed by the application.

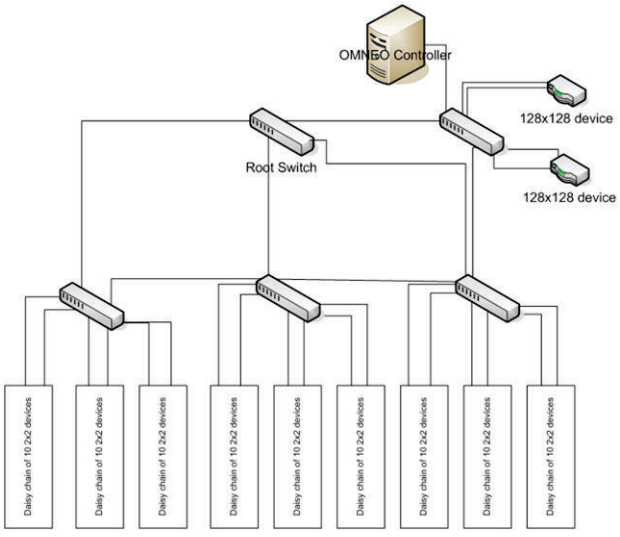


Figure 12.1: Small network

In a small network, the following is true:

- All 1Gbps switches
- Total 93 units
- Total 436 transmit channels
- Maximum hop count 12
- Loopback to other switches is more reliable

12.2.2 Large system

Large System

- Can contain from 129 – 450 nodes
- System requires servers
  - DHCP server required, ARNI G2 or external server – If using an external DHCP server, it must be capable of assigning all the nodes in the subnet an IP Address within two (2) seconds
  - ARNI G2 is required as a DNS server
  - PTP server required, must be an ARNI G2
  - System requires a configured ARNI G2 unit. Configuration on ARNI G2 is done via the ACT Software (see *Introduction, page 6*)

Notice!
When a request for a non-OMNEO node is received (for example, an internet search request), the ARNI G2 delegates the request, which it cannot fulfill its parent DNS server.

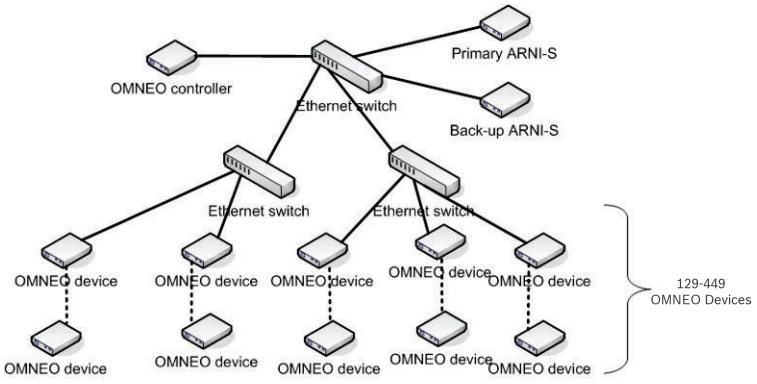


Figure 12.2: Large Network

In a large network, the following is true:

- All 1Gbps switches
- Total 93 units
- Total 436 transmit channels
- Maximum hop count 12
- Loopback to other switches is more reliable

12.2.3 Audio redundancy

Audio redundancy is a failover protection ensuring audio is always available, even when a network path fails. If you have multiple Ethernet connections and multiple subnets; unfortunately, to have redundant audio, you cannot daisy chain across subnets.

Restrictions

- Available topologies vary by OMNEO nodes. Please refer to your product documentation to verify audio redundancy is supported.
- Only works for audio.

Considerations

- A redundant system doubles the required network hardware.
- Within a subnet, there two (2) basic topologies allowing redundancy; daisy chain and star topology.

Consult your product documentation for details on your product.

12.2.4 Daisy chain topology

Daisy Chain Topology

A daisy chain topology allows the wiring of one (1) device directly to another device without the need for additional hardware. Daisy chains can carry audio, power, and control data. A daisy chain may be able to be connected in a loop to achieve redundancy (consult your product documentation for details.

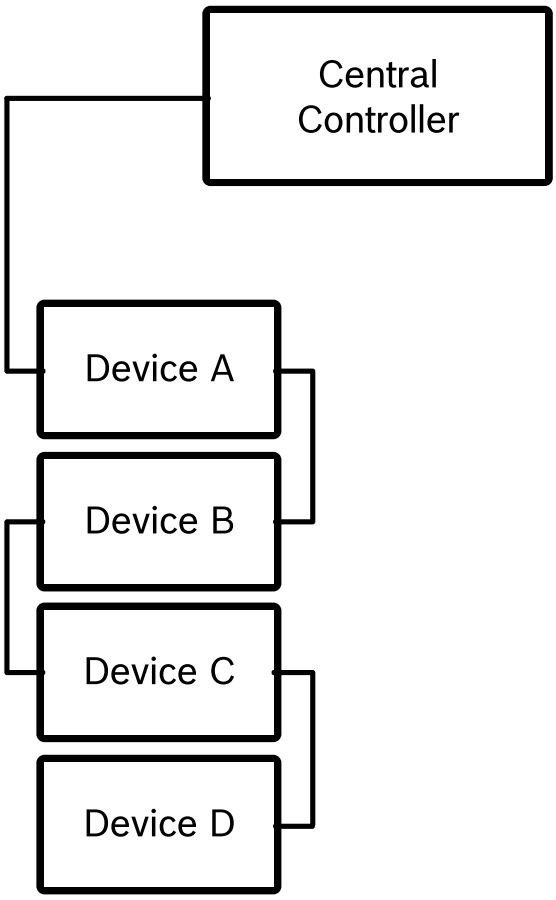


Figure 12.3: Daisy Chain Topology Non-Redundant

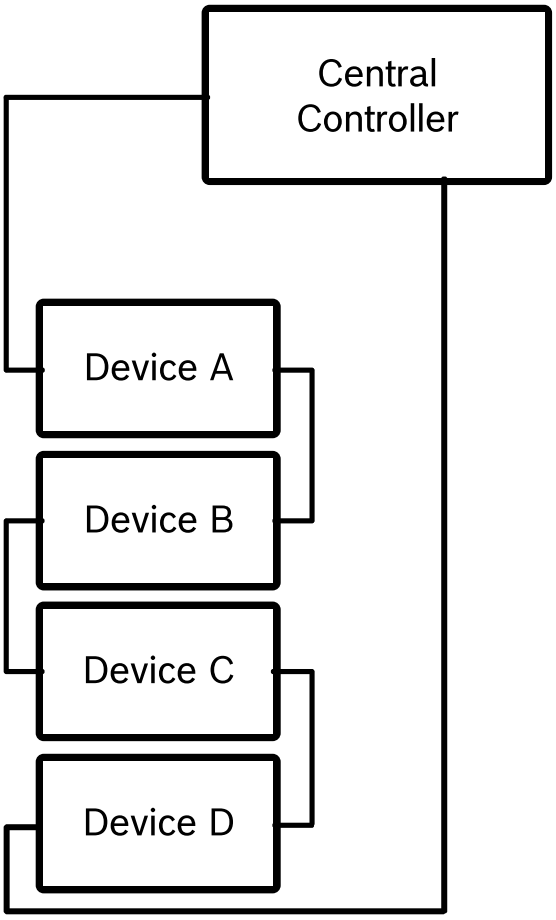


Figure 12.4: Daisy chain topology with redundancy

12.2.5 Star topology

Star Topology

Star topology is used to connect each node to a central device. In networks, this central device is a switch.

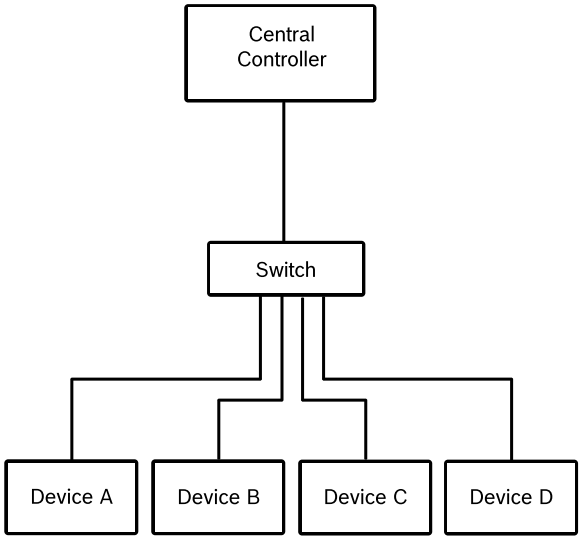


Figure 12.5: Star topology non-redundant

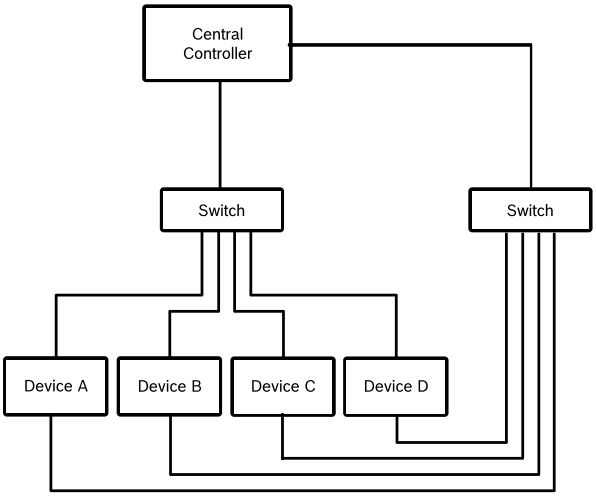


Figure 12.6: Star topology redundant

12.3 Routed network

Routed network

A routed network is any network with multiple subnets connected together by one (1) or more IP routers.

The minimum requirements for a routed network are:

- 1Gbps or higher Ethernet ports.
- Supports PIM-DM or Bi-Directional PIM.
- Performs IP routing in hardware to minimize routing delay.
- Packet forwarding rat >1,000,000 packets per second per port.
- Non-blocking backplane per switching port (2 Gbps per port required).
- MAC Address table of at least 1000 addresses per directly connected subnet.

Multi-subnet system

A multi-subnet system usually consists of the following:

Notice!
Two (2) ARNI-E G2 devices are not allowed in the same multi-subnet systems.

- 2–40 subnets. A subnet is logical grouping of connected network nodes. Nodes on a subnet tend to be located in close physical proximity to each other on a LAN.
- This type of system can have up to 10,000 nodes attached to it at any one time.
- Subnets that have over 128 nodes require an ARNI-S G2 or ARNI-E G2. Subnets that have under128 nodes do not require an ARNI G2. It is not necessary to have an ARNI G2 device in each subnet, but you must configure which nodes belong to which ARNI G2 device. You must pay special attention not to exceed the ARNI G2 device's 450-node capacity.
- One (1) ARNI-E G2 and zero (0) or more ARNI-S G2 devices are required.
- Subnets are limited to privately owned and maintained networks.
- A multi-subnet system requires servers to limit the multicast traffic:
  - DHCP Server – ARNI G2 or external router for small subnets.
  - DNS Server – must be ARNI G2 (delegation possible though)
  - PTP Server – must be ARNI G2, boundary clock in small subnets.

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