GE Vernova

Grid Solutions

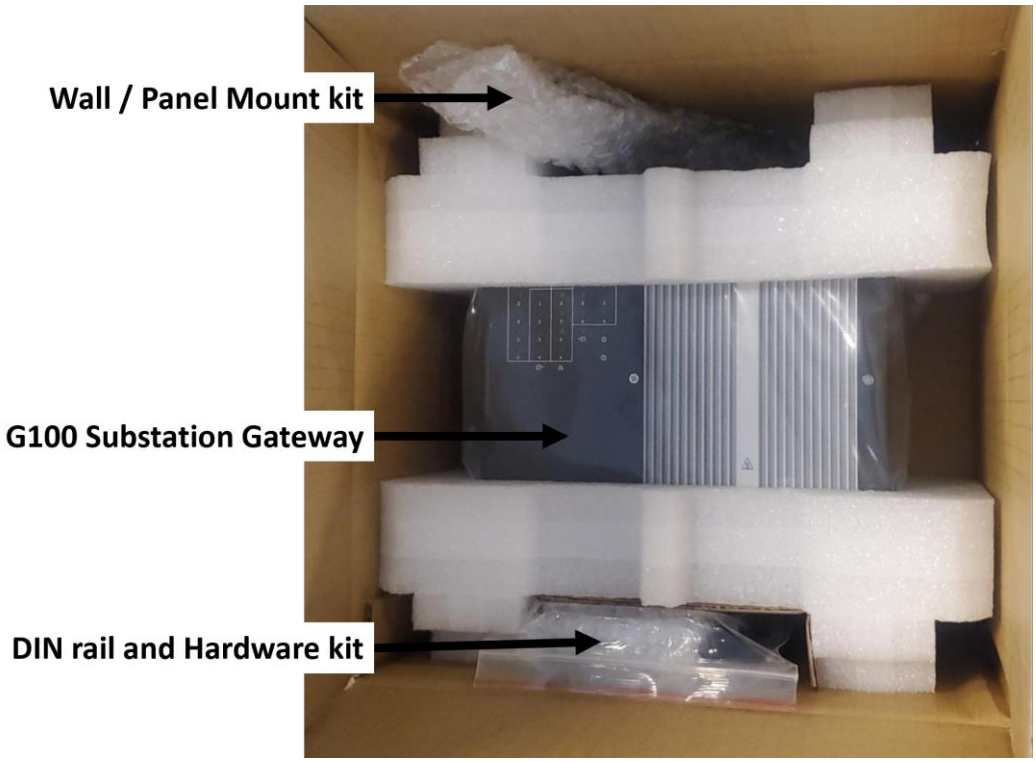
G100 Substation Gateway

Quick Start Guide

This document applies to G100 v4.00.

Please refer to previous versions of this document for previous G100 releases..

What's in the Box?



Your kit includes the following:

- G100 Substation Gateway
- Wall / Panel mount kit
    - Wall / panel mounting bracket (quantity 2)

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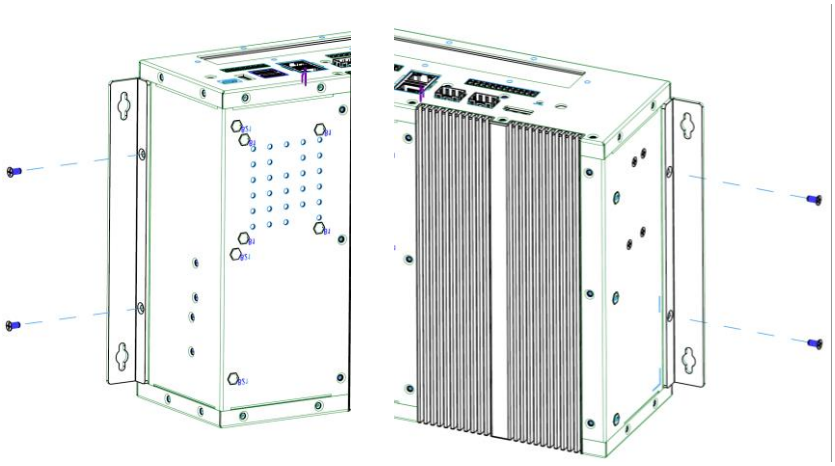
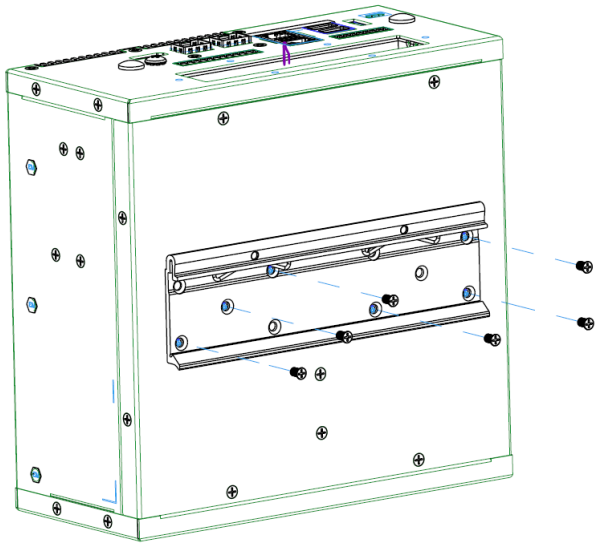
- DIN rail and hardware kit
    - DIN Rail (quantity 1)
    - Screws (quantity 6)
    - Analog DC Input (AI) connector (quantity 1)
    - Binary Input (DI) connector (quantity 1)
    - Binary Output (DO) connector (quantity 1)
    - Power input connector (quantity 1)
    - IRIG-B input connector (quantity 1)

The Wall / Panel mount kit included in the G100 carton includes 2 wall/panel mount bracket. The 2 wall/panel mount brackets can be optionally attached to the G100 chassis for mounting the G100 to a wall or panel. The brackets are attached to the G100 chassis using the 2 lower M3 screws on the left and right side of the chassis. Refer to G100 Instruction Manual for full installation procedure.



The DIN rail and hardware kit included in the G100 carton includes a DIN rail bracket along with 6 mounting screws. The DIN rail bracket can be optionally attached to the back of the G100 chassis for DIN rail mounting applications. Refer to G100 Instruction Manual for full installation procedure.



Missing Something?

Contact GE Vernova Customer Service right away and we'll figure it out. Be sure to include your order number and mail address associated with your order.

Prerequisites

- DS-Agile Studio's MCP Studio
- Minimum Windows 7 x64, 10 x64 and 8GB Memory required for DS Agile MCP Studio

G100 Interface Options

The following connection/interface options are available after G100 first powers up.

- Local KVM (Keyboard, Video, Mouse)
- Ethernet port # 1 – Default IP address 192.168.168.81
- Serial port # 4 in RS232 mode, with a baud rate 115200

Setup & Configuration Tools

The following setup & configuration tools are available for the G100.

1. **DS Agile MCP Studio** Offline & Online Editor : To configure the Gateway & SCADA Configuration.
2. **G100 Runtime HMI** (Remote/Local) : To view and control the runtime stats including One-line diagrams and to configure the G100 Settings (e.g. User Management, Automatic Login etc.).
3. **G100 Gateway Settings GUI (or Shell based application)** : To configure G100 system settings and perform the initial G100 setup (e.g. Users, network, serial, time sync etc.).

NOTES:

- The G100 and G500 are part of the same ***MCP*** (Multifunction Controller Platform) family and share the same applications and workflows.
- Due to this, some options are available in G500 and not available in G100 and are marked as such where applicable (e.g. G500 has 6 Ethernet ports, G100 only 4, etc.). Attempting to configure settings marked as not available in G100 will not result in any changes.
- Sections and figures in this document, various prompts, and menus – refer to MCP, and are applicable to either G100 or G500, unless marked specifically otherwise.

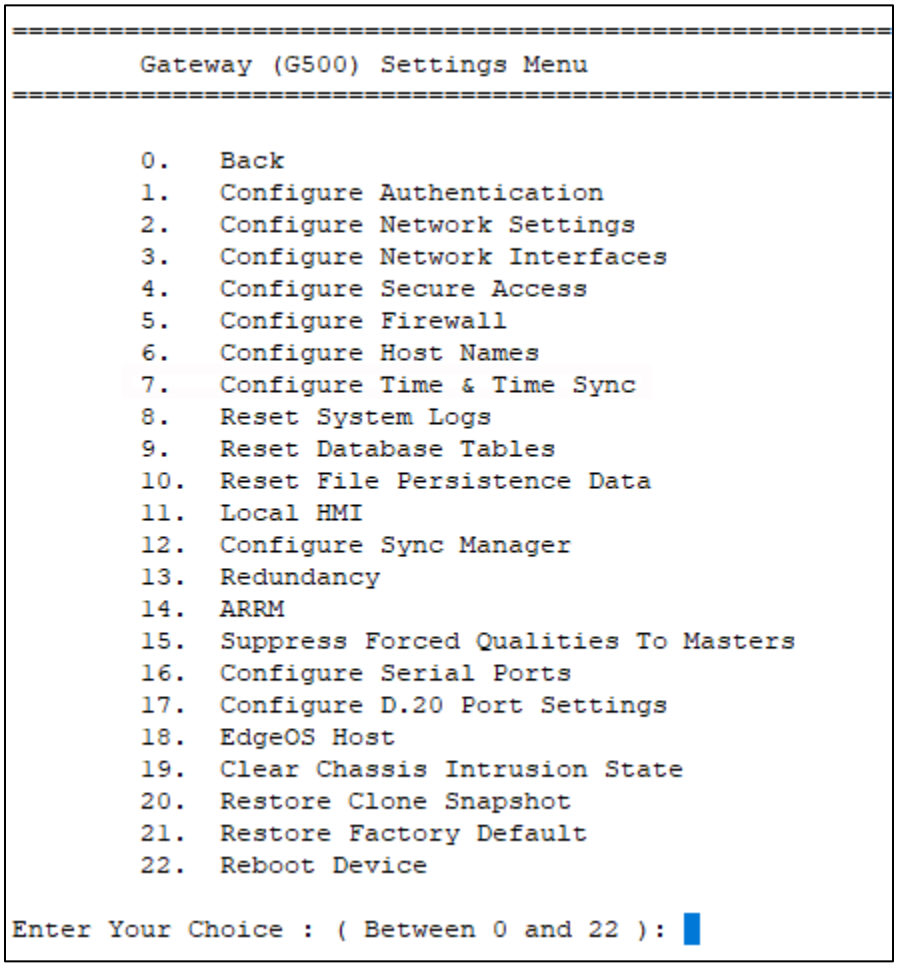
Shell access-based Settings workflow

This document presents Settings workflows based on the Web based Settings GUI interface.

The same settings operations can be performed using a terminal emulator connected to the G100 Shell, either via the serial maintenance port #4 or using an SSH (port 22) connection.

1. Start a terminal session and log into the G100 with an Administrator-level or root user account.
2. At the G100 #>> prompt, enter the following commands:
   - **sudo mcpcfg**

Result: The shell-based settings application starts:



G100 Gateway Settings GUI

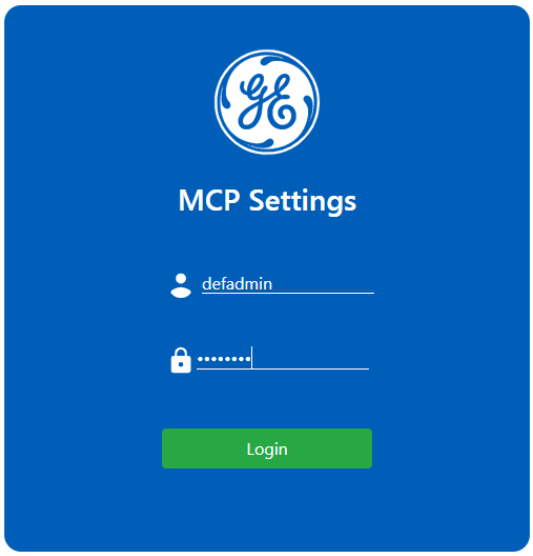
The local G100 settings, including Serial ports, Network configuration, Time settings, Administrators user management etc. are managed using the Gateway Settings GUI.

You can access MCP Settings Web Interface through Local (KVM) or Remote G100 connection. Remote access must be completed using a supported web browser (Internet Explorer, Microsoft Edge, Mozilla Firefox, Google Chrome).

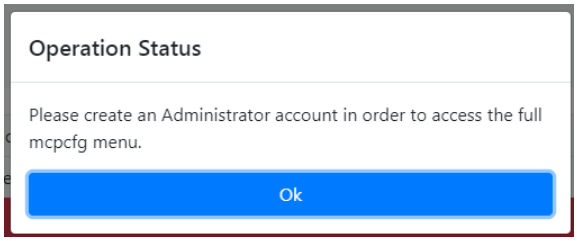
Initial Setup

NOTE: Initial Setup section is identical between Local KVM/Remote access.

1. Enter the default **Username** (defadmin), default **Password** (defadmin) and click **Login**.

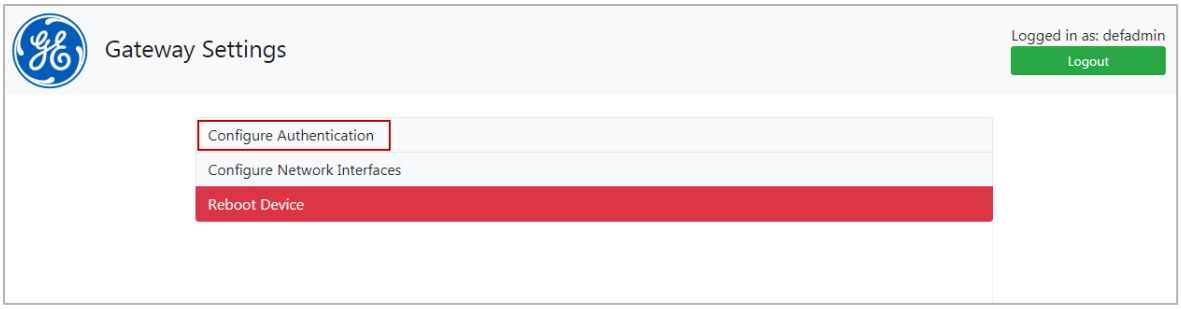


2. If the **defadmin** account is used to login, you will be prompted to create an **Administrator** account to access the full Settings GUI menu. Click **OK**.

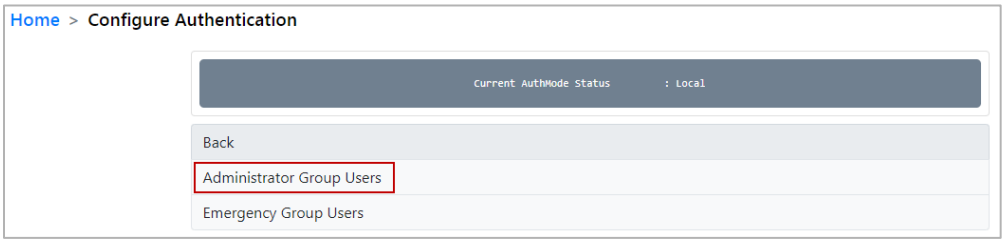


3. The **Gateway Settings** main menu appears.

   Select the **Configure Authentication** tab from the main menu.



4. Select the **Administrator Group Users** tab from the **Configure Authentication** menu.



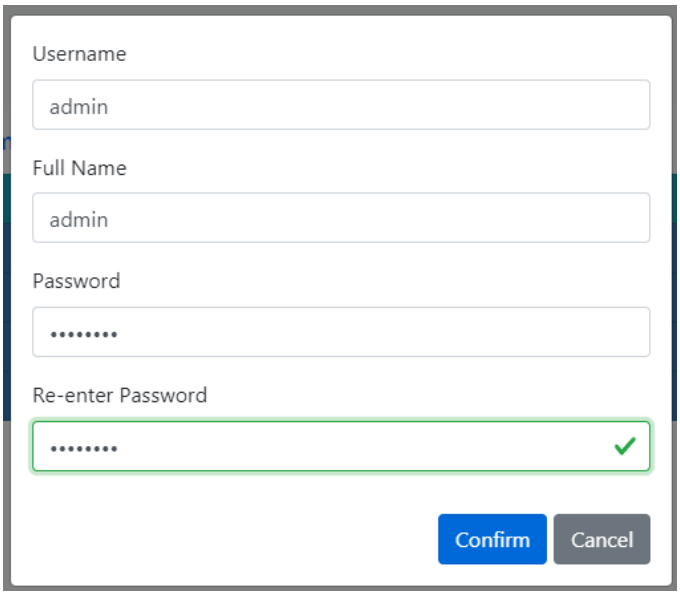
   This function is used to perform the following actions:

- List Users
- Add User
- Change Password
- Remove User

5. Select the **Add User** tab to create administrator-level users.

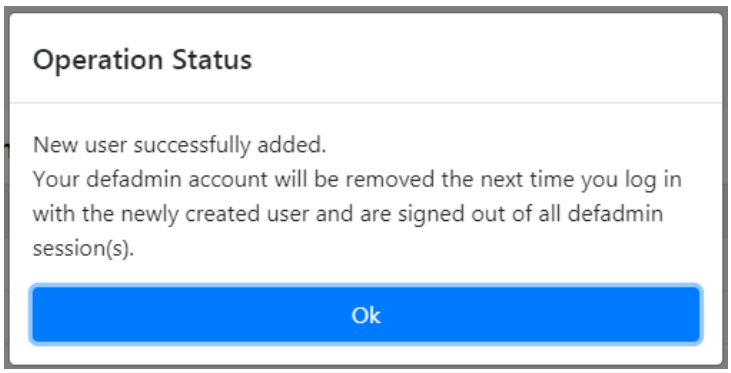
- Enter the desired **Username**, conforming to the Username rules as listed below:
  - Username must be between 2 and 31 characters
  - Username must start with a lowercase alphabetical character
  - Username must only contain [a-z] [0-9] [-,_] characters
- Enter the **Full Name** of the User.
- Enter the **Password**, conforming to the password security rules as listed below:
  - Password must be between 8 and 199 characters in length
  - Password must contain:
    - 1 character from [a-z]
    - 1 character from [A-Z]
    - 1 digit from [0-9]
    - 1 special character from the set [$%@!&]

- **Re-enter Password** and click **Confirm**.

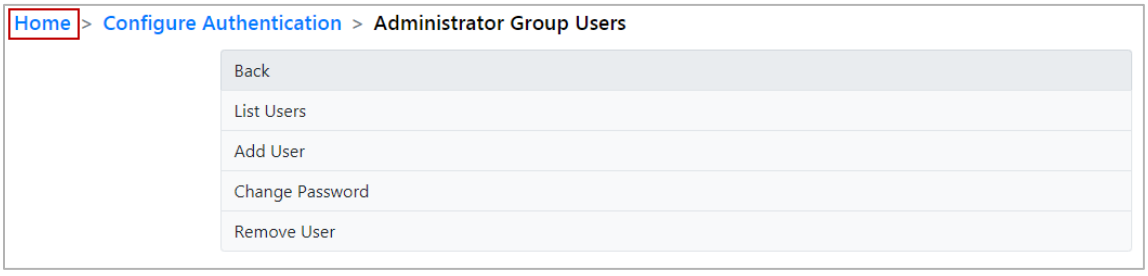


RESULT: Pop-up window appears showing the **Operation Status**, click **OK.**

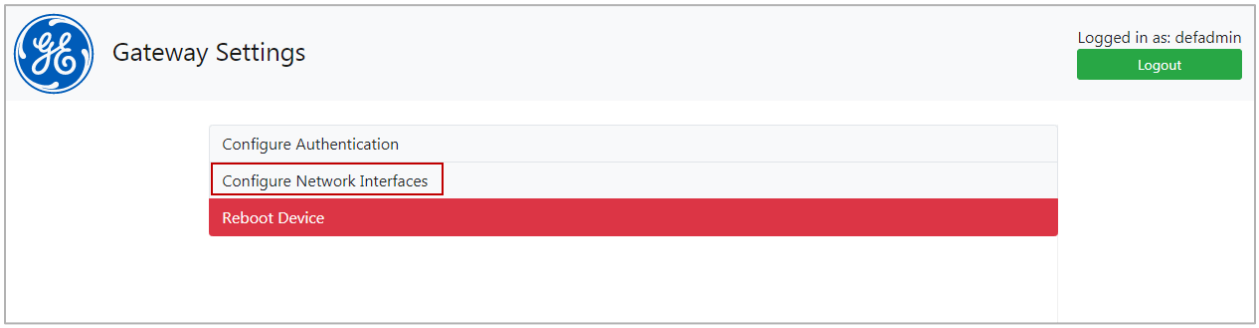
NOTE: defadmin account will be removed the next time you login with the newly-created user and are signed out of all defadmin sessions.



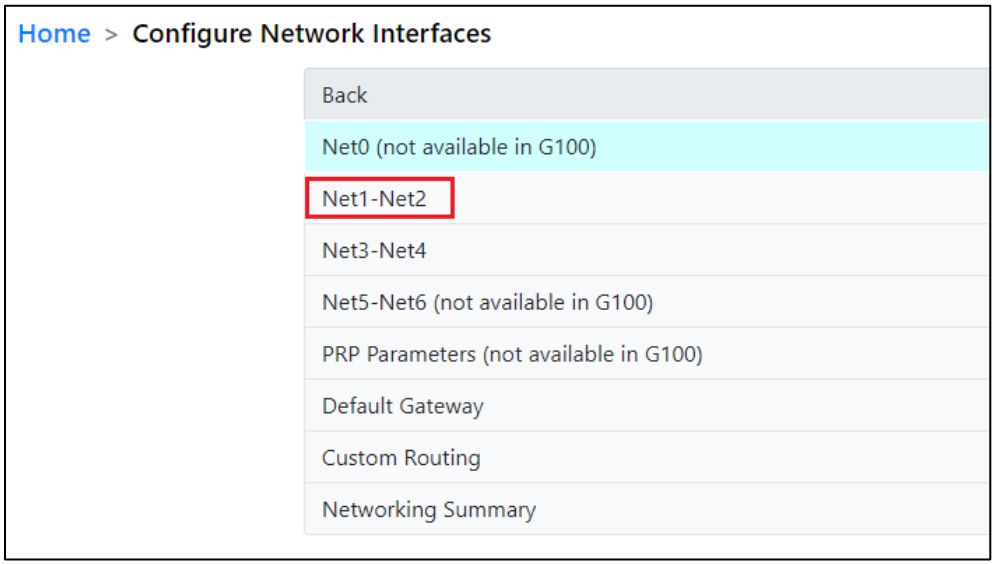
6. Navigate back to the main menu by clicking on the **HOME** link located at the upper left corner of the page.



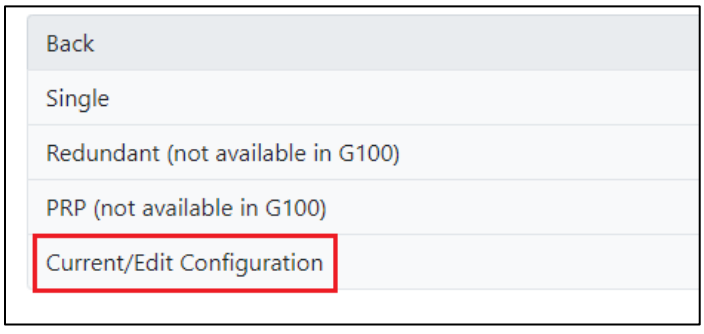
7. Select the **Configure Network Interfaces** tab from the main menu.



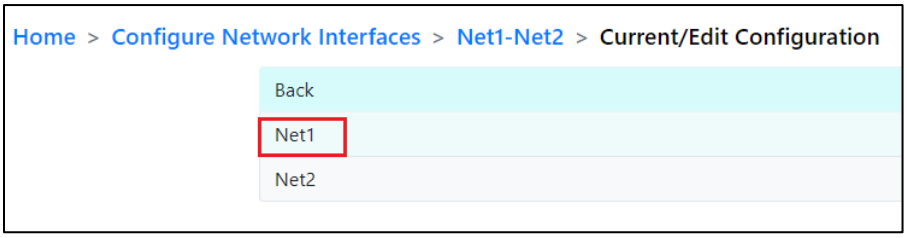
8. Select the desired Network port (**default Net1-Net2/192.168.168.81**) which is connected to G100 device from the list.



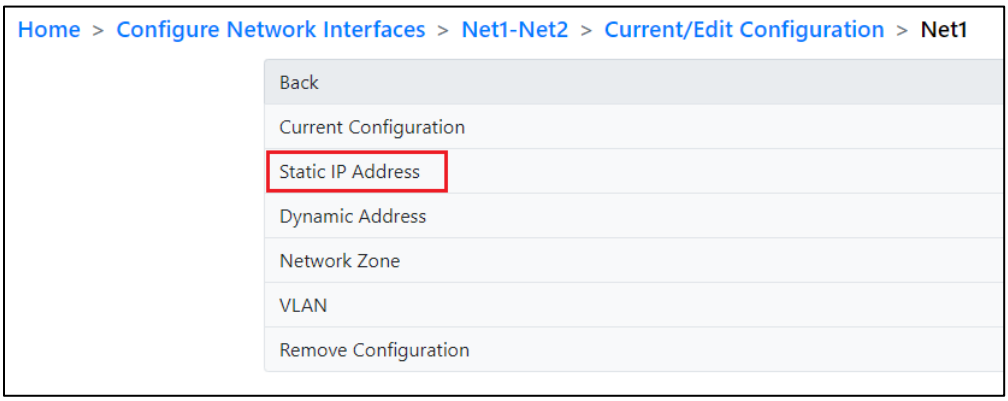
9. Select the **Current/Edit Configuration** tab.



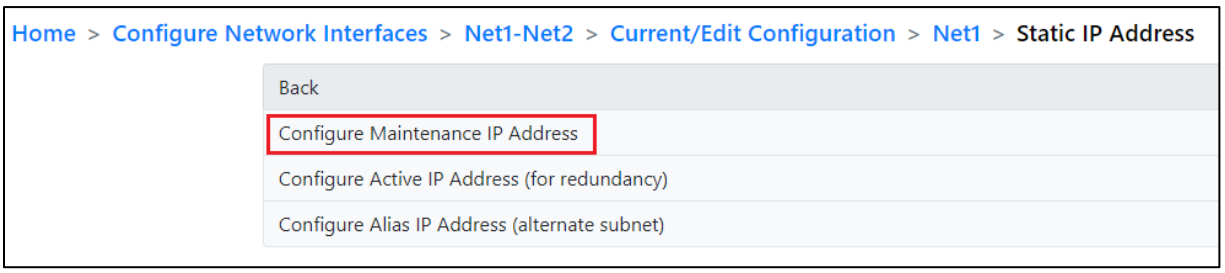
10. Select the **Net1** tab.



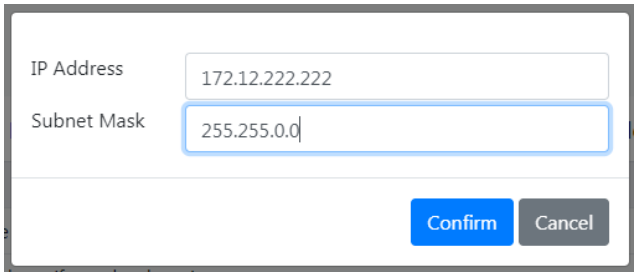
11. Select the **Static IP Address** tab.



12. Select the **Configure Maintenance IP Address** tab.

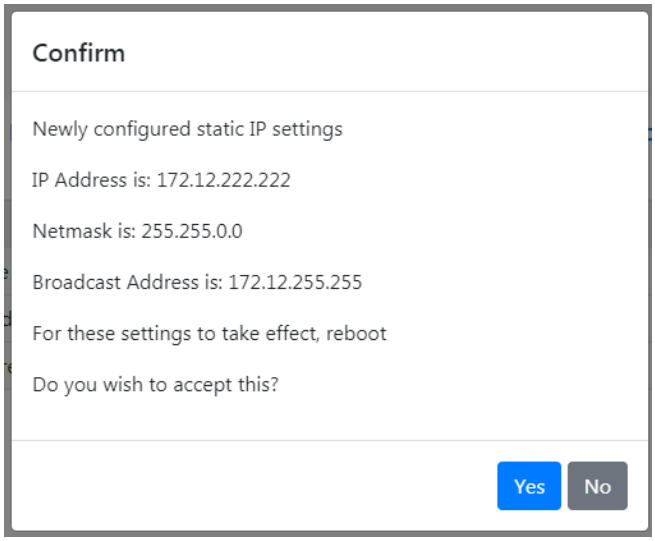


13. Enter **IP Address** and **Subnet Mask**. Click **Confirm**.



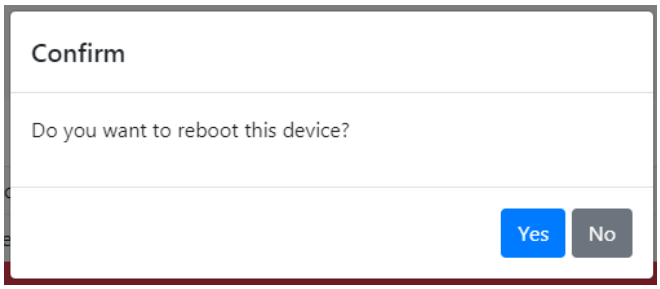
14. Click **Yes** to confirm the newly-configured static IP settings.

    NOTE: Reboot the device for changes to take effect.



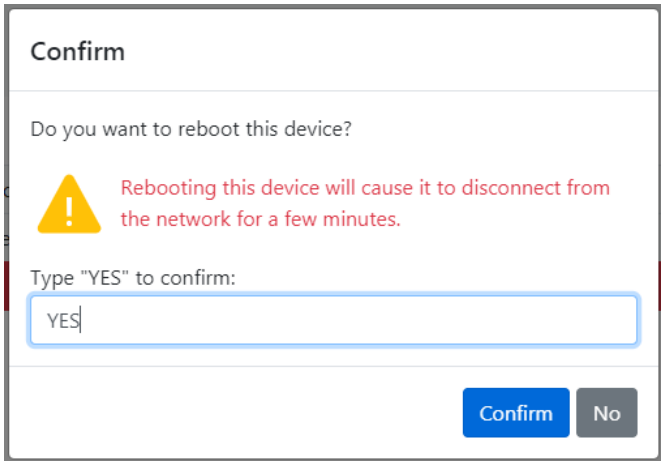
15. Navigate back to the main menu and select the **Reboot Device** tab.

16. Click **Yes** to confirm and the device is rebooted.

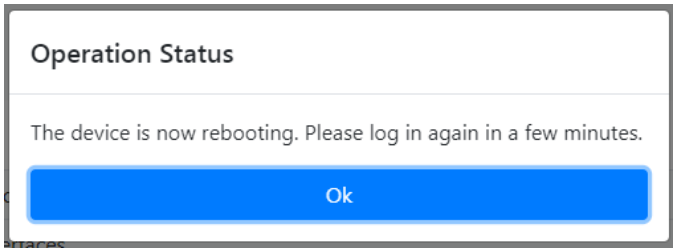


17. Type "**YES**" and click **Confirm**.

    NOTE: Rebooting the device will cause it to disconnect from the network for a few minutes.

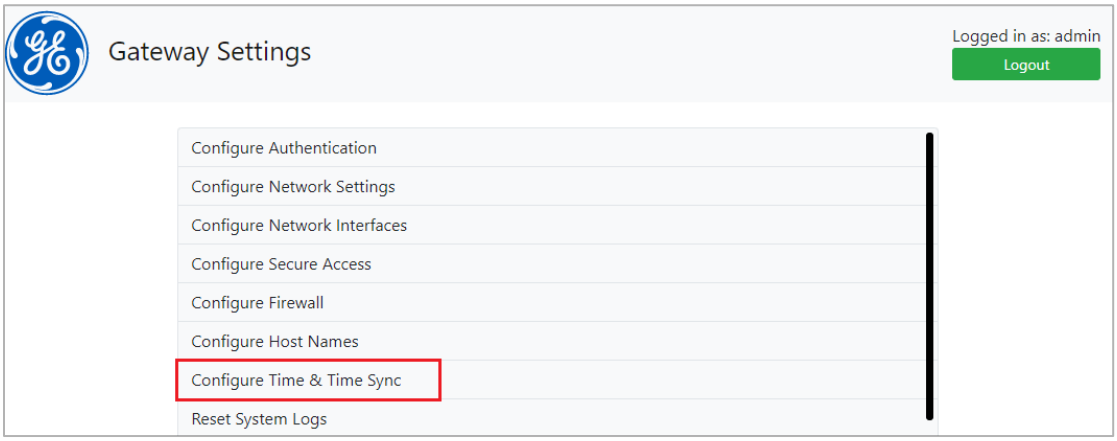


    RESULT: The device reboot takes place. Click **OK**.

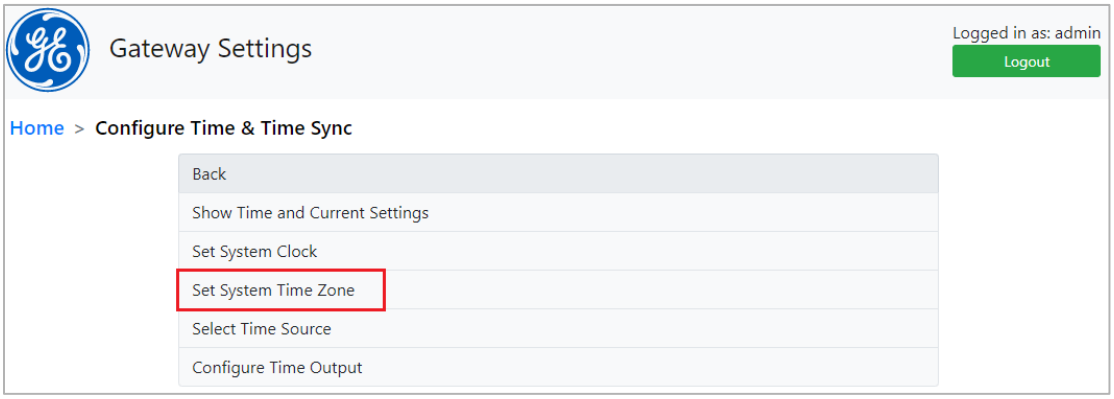


18. Upon G100 reconnect, you can access **MCP Web Interface** remotely via the newly configured IP Address and a supported web browser. In the supported browser address bar, type in the new G100 device IP (ex.: **172.12.222.222**) as shown in figure below:

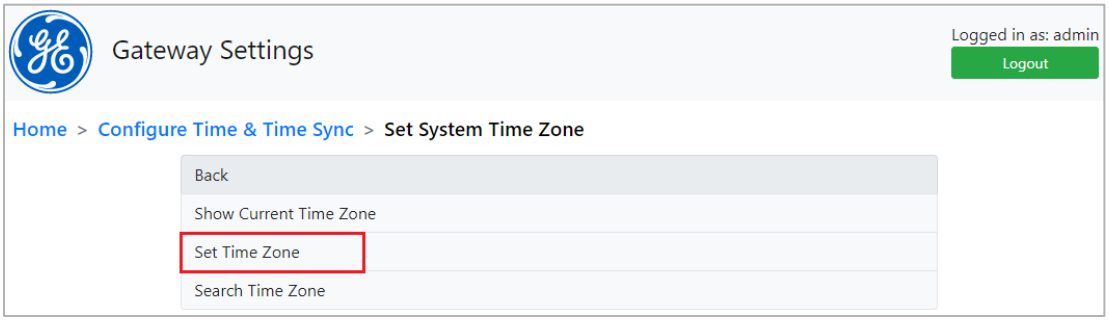
19. Press the **Enter key** and the **MCP Settings Login** page appears.
    Login using the newly created admin username/password and click **Login**.
    Select **Configure Time & Time Sync** tab.



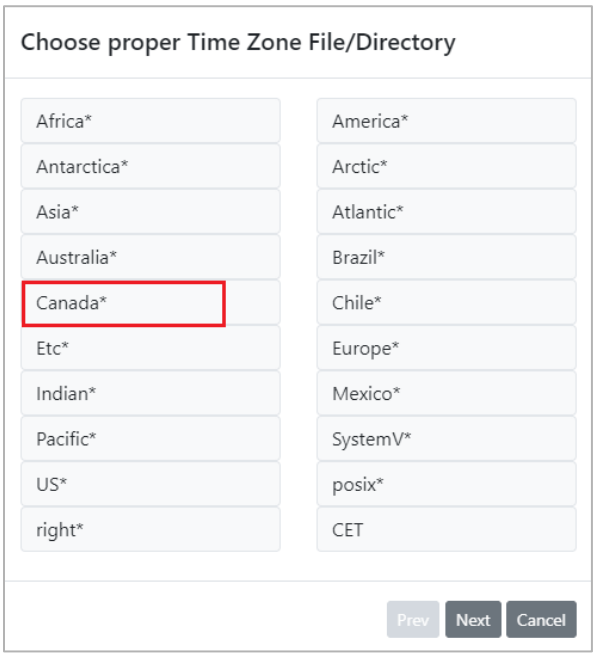
20. Select the **Set System Time Zone** tab.



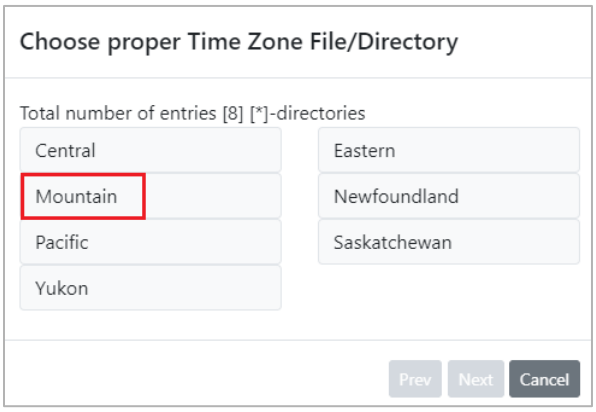
21. Select the **Set Time Zone** tab to configure the G100 to the same time zone as remote PC.



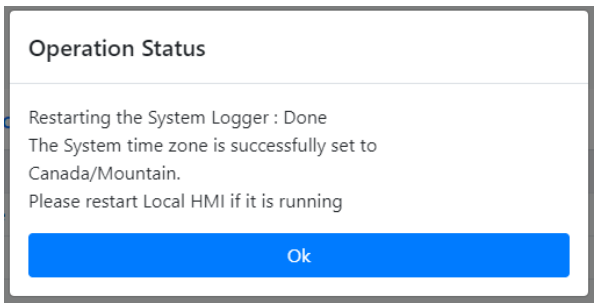
22. Select the applicable time zone. User can navigate the menu using **Prev/Next** buttons.



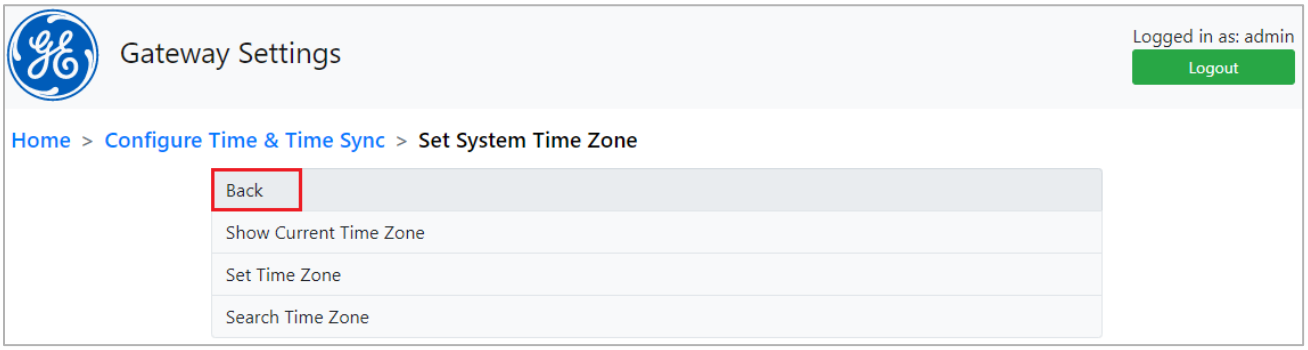
23. Select the applicable region within the selected time zone.



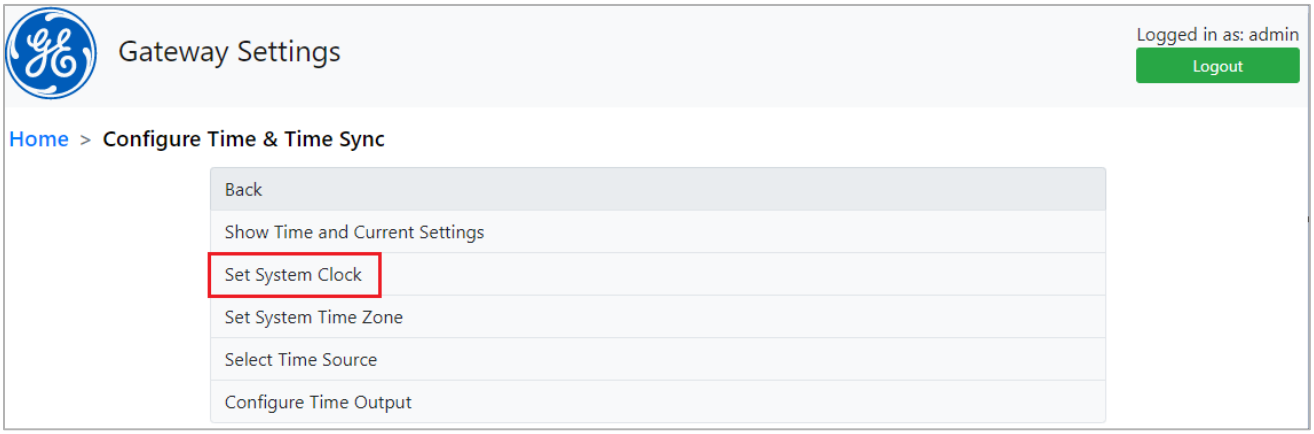
RESULT: The Operation Status dialog shows success message. Click **OK**.



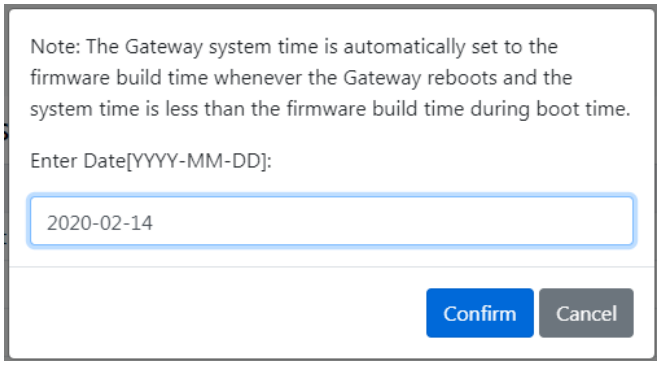
24. Select the **Back** tab.



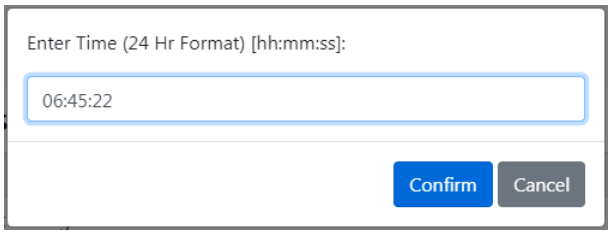
25. Select the **Set System Clock** tab.



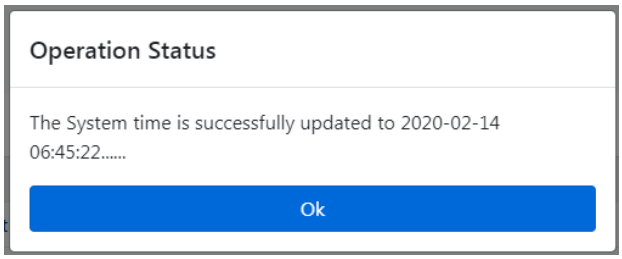
26. A dialog is displayed informing the user to enter a date using the format **YYYY-MM-DD**. Enter **today's date** and select the **Confirm** button.



27. A dialog is displayed informing the user to enter time, using the **24 Hr Format hh:mm:ss**. Enter **remote PC time** and select the **Confirm** button.

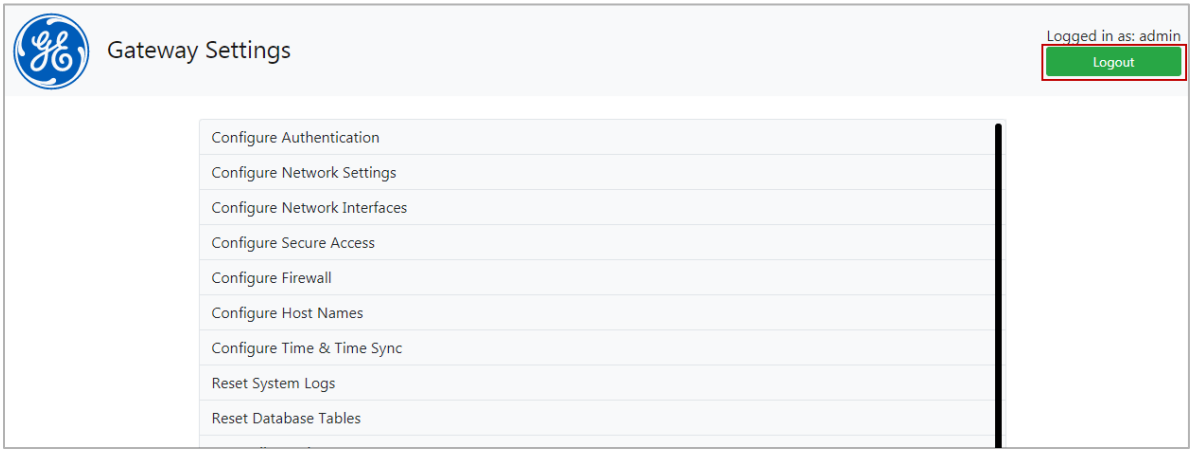


RESULT: The Operation Status dialog shows success message. Click **OK**.

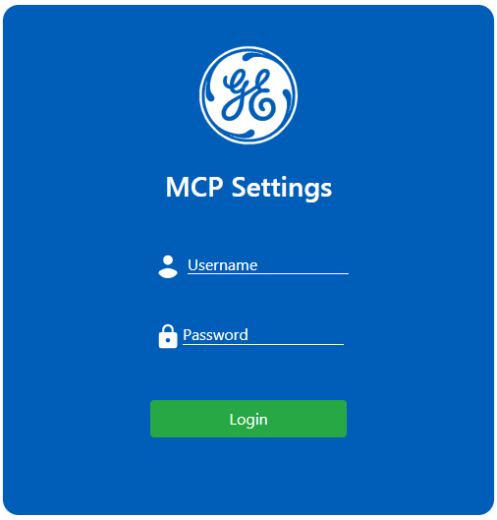


Logout

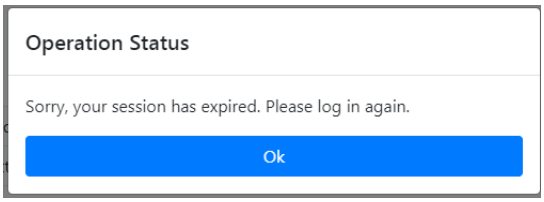
To **logout**, click the **Logout** link located at the upper right corner of the page as shown in the figure below.



When you have successfully logged-out of the system, the screen below will be displayed.



NOTE: After 20 minutes of inactivity, the session is automatically timed out and a message will be displayed as shown in below figure. In such cases, either click **OK** and login again or click on any of the links to be redirected to the login page.



G100 Snapshot Compatibility

The below table shows the G100 Snapshot Compatibilities, as well as available conversion paths from D400 or G500 to G100:

FULL "Clone" Snapshot compatibility Configuration+Settings (using DSAS 2.1 or later)		Restore snapshot (Configuration and Settings) **to target device:**				Restore snapshot (Only Configuration part) **to offline device:**			
Save snapshot **from device:**		**D400**	**MCP (G500/G100 within same type)**			**D400**	**MCP (G500/G100 within same type)**		
		Any version	**1.00**	**1.10**	**2.00 or later**	**Any version**	**1.00**	**1.10**	**2.00 or later**
D400	<= 5.20	YES ONLY same D400 and same version	N/A	N/A	N/A	YES Direct same version	N/A	N/A	N/A
	5.30 or later	YES ONLY same D400 and same version	N/A	N/A	N/A	YES Direct same version	Indirect Via Create MCP	Indirect Via Create MCP	Indirect Via Create MCP
MCP	1.00	N/A	YES ONLY same MCP	N/A	YES ANY MCP	N/A	YES Direct	Indirect Via Offline Upgrade	Indirect Via Offline Upgrade
	1.10	N/A	N/A	YES ANY MCP	YES ANY MCP	N/A	N/A	YES Direct	Indirect Via Offline Upgrade
	2.00 or later	N/A	N/A	N/A	YES ANY MCP	N/A	N/A	N/A	YES Direct same version

G100 Snapshot Management

"Snapshots" are an archived image of the G100 configuration created using DS Agile MCP Studio, which include all settings required to completely recover a G100 device. This workflow greatly reduces time when replacing hardware, eliminating the need for additional manual configuration.

Using DS Agile MCP Studio, Snapshots can be restored to the G100 using the "**defadmin**" default credentials.

Restoring a Snapshot updates the new G100 with the following hardware and software settings as were defined in the original G100, at the time when the snapshot was taken:

1. User Authentication
2. Network Settings
3. Network Interfaces
4. Secure Access
5. Firewall settings
6. Host Names
7. Time settings and time synchronization
8. Local HMI settings – except number of displays and displays resolution which are specific to the G100 being restored
9. Synch Manager
10. Redundancy (except paired keys when the G100 target is already paired as redundant)
11. Emulation of D20 IEC101 DPA Unbalanced Mode and quality event suppression at startup
12. Serial port modes (RS232/485, 2/4 wires)
13. Configuration implemented in MCP Studio:
    - Connections
    - Client and Server Map files
    - System Point Manager
    - Alarms
    - Calculator
    - Data Logger (storage may need to be re-adjusted if the target G100 has different storage sizes)
    - Load Shed
    - Systemwide (storage may need to be re-adjusted if the target G100 has different storage sizes)
    - Access (Local users, Automatic HMI login settings, VPN Client List)
    - ARRM
    - AI Text Enumeration
    - Oneline Screens
    - Analog Reports
    - IEC 61850 Client
    - LogicLinx

Cyber security related Certificates are not included in snapshots, and therefore cannot be restored. All certificates must be imported again after the snapshot restore. All secure connections using certificates must be re-associated with the new imported certificates (e.g. Secure Connection Relay, VPN Server, etc.).

License file (key) is not restored with the snapshot.

G100 enrollment in Predix Edge Manager Cloud and associated settings are not restored with the snapshot.

Default Users

G100 from the factory has two default users.

1. **Default Root User** – **root** (root has all permissions to the G100 but only available via the serial maintenance port).
2. **Default Administrator user** – **defadmin** (restricted permissions - used for initial setup).

NOTE: There are no other default users on a from factory G100.

Default Root User - root

G100 unit that comes from factory has below default **root** user credentials.

User Name: **root**

Password: **geroot**

The default root user is a super user in G100 which can access all the settings and files. The **root** user access is restricted via:

- serial maintenance port

NOTE: For Cyber Security reasons users are required to change this default root password using G100 Local Configuration Utility (**MCP Settings GUI**).

Warning: The User is responsible for the new root password. There is no back door, if lost a factory reset is required to recover a unit. Contact customer support for a Return Materials Authorization (RMA) estimate.

Default Administrator User – defadmin

G100 unit that comes from factory has below default administrator **(defadmin)** user credentials.

User Name: **defadmin**

Password: **defadmin**

G100 supplies a temporary default administrator user with limited access for initial hardware configuration. This **defadmin** user can perform only limited set of operations.

The default administrator (defadmin) user cannot perform other settings or gateway configuration changes, any operational workflows and login to runtime HMI. The default administrator (defadmin) user is intended to perform only below operations.

- To change or configure IP address to ethernet ports

- To add a nominated administrator-level user(s)
- To restore G100 Snapshots

Warning: The default administrator (**defadmin**) user will be deleted automatically once a nominated administrator user is created successfully. The local root user is required to recover the new administrator user if the credentials are lost.

Getting Started

Refer to G100 Substation Gateway Instruction Manual (*GE Vernova Part Number 994-0155*) for details about powering up the G100. Once the G100 is powered up use the below workflow(s) to prepare the G100 for operation.

1. Minimum setup for a new G100 without a pre-existing **Snapshot**:
   - Task 1: Connect to the G100
   - Task 2: Create a New Administrator User
   - Task 3: Set the Network Ports Parameters (IP Address, SFP)
   - Task 4: Change the Root Password
   - Task 5: Download existing G100 Configuration
2. To restore an existing G100 Snapshot:
   - Task 1: Connect to the G100
   - Task 2: Restore Snapshot to the G100

NOTE: In the following procedures/workflows, "**Enter**" indicates that the menu item number is typed in and then the Enter key is pressed.

Setup G100 - First Time Setup

Task 1: Connect to the G100

There are three methods to connect to a new G100:

- Local monitor and keyboard via Local KVM interface (Keyboard Video Mouse).
- Using a supported Web Browser, connect to the front maintenance LAN port - default IP address 192.168.168.81
- USB Serial connection via the front USB type B maintenance port.

Connect to G100 via Local KVM GUI

1. Connect the Display Port on the rear panel of the G100 to a monitor with a Display cable.
2. Connect a keyboard and mouse to any of the USB ports.
3. Once the G100 device is powered up and has a valid license installed, click on the **G100** name via the taskbar.
4. Click **System Settings**.
5. A default web browser will be opened showing **MCP Settings Login** screen.
6. Enter the default **Username** (defadmin) and default **Password** (defadmin) and click **Login**.

Connect to G100 via LAN port

1. Connect a LAN cable between your computer and the G100 LAN port configured for maintenance (default is Net 1, but any configured LAN port allowed in the firewall can be used).
2. Using a supported web browser, type the Net 1 default IP 192.168.168.81 into the address bar and press the 'Enter key'.
    - The PC's network settings will have to be configured to the same subnet as the G100 to establish communications.
3. User is required to **confirm security certificate** exception.
4. The **MCP Settings Login** screen is displayed.
5. Enter the default **Username** (defadmin) and default **Password** (defadmin) and click **Login**.

Connect to G100 via Serial Maintenance Port

NOTES:

The default maintenance serial port is enabled, set as # 4, and configured as RS232 at 115,200 bps. Refer to the G100 Substation Gateway Instruction Manual (*GE Vernova Part Number 994-0155*) for RJ45 serial port pinout.

The serial maintenance port can be disabled as following:

- In UEFI for the POST access only. Make sure that UEFI is set to RS232.
- In Settings for Shell access and use by other runtime applications.

If the serial maintenance port is disabled, users can still access the device using either Local KVM or Ethernet ports.

If the serial maintenance port was disabled, and the IP addresses are not known – then access can be done using Local KVM.

Steps:

1. Connect an RS232 cable between your PC and the maintenance serial port of the G100.
2. Launch the **Secure Terminal Emulator** from the DS Agile Studio folder in the start menu.
3. Select **File** > **Connect** and ensure the Protocol is set to **Serial Port.**
4. Confirm the settings before selecting Connect.
    - Serial Port: Select the PC serial port for the connection to G100
    - Baud rate: **115200**
5. At the G100 command shell login prompt, enter the default admin credentials:
    - Username: **defadmin**
    - Password: **defadmin**

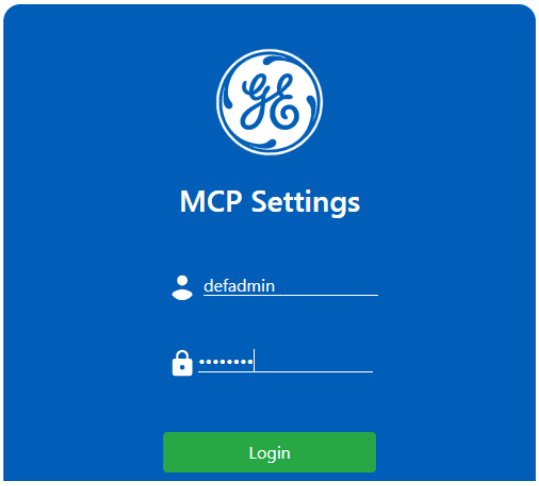
Task 2: Create a New Administrator User

The default administrator (**defadmin**) is restricted to prevent setting or gateway configuration changes. This is to force the creation of a new nominated administrator-level user account to continue the G100 Setup. New administrator-level user account(s) are created using G100 Local Configuration Utility (MCP Settings GUI). After completing this task, the defadmin user is removed automatically.

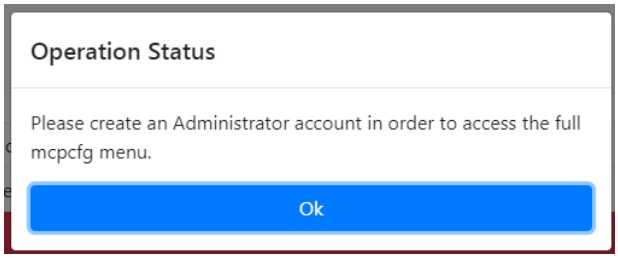
To create a new administrator-level user account, follow the steps below using Settings GUI.

NOTE: This section is identical between Local and Remote Settings GUI access.

1. Enter the default **Username** (defadmin), default **Password** (defadmin) and click **Login**.

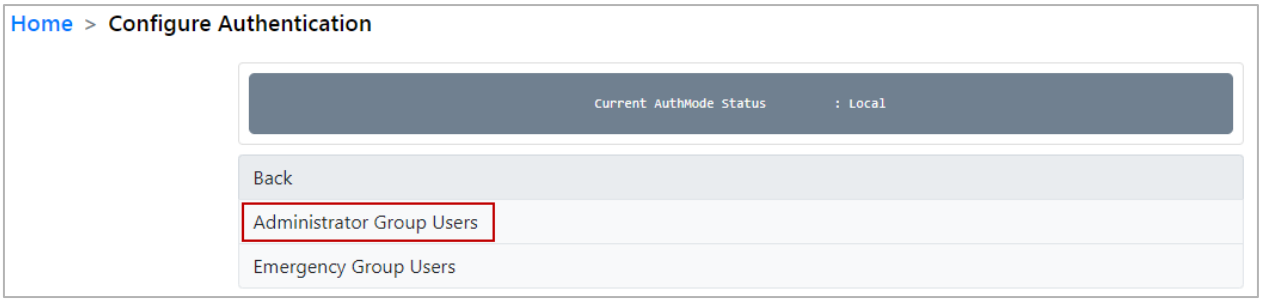


2. If the defadmin account is used to login, you will be prompted to create an Administrator account in order to access the full Settings GUI menu. Click **OK**.



3. The Gateway Settings main menu appears.
   Select **Configure Authentication** tab from main menu.

4. Select **Administrator Group Users** tab from the Configure Authentication menu.



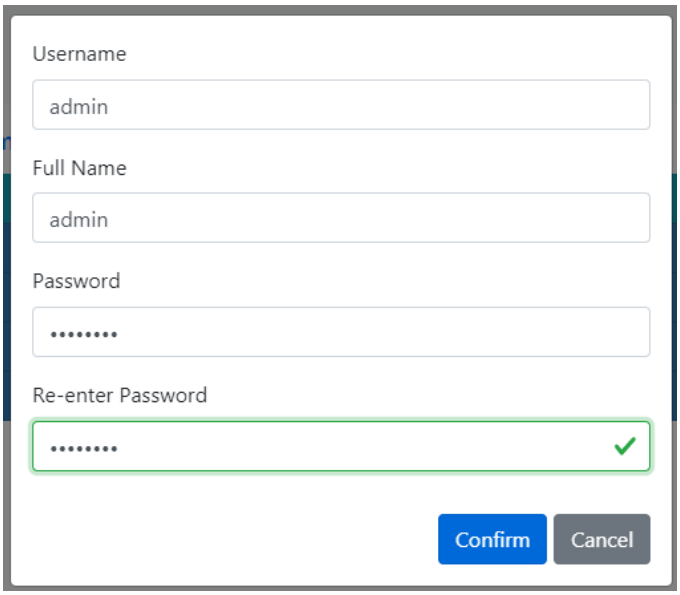
This function is used to perform the following actions:

- List Users
- Add User
- Change Password
- Remove User

5. Select the **Add User** tab to create administrator-level users.

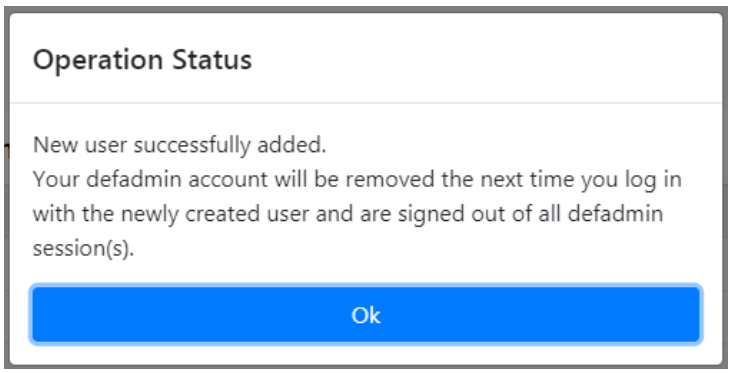
- Enter the desired **Username**, conforming to the Username rules as listed below:
  - Username must be between 2 and 31 characters
  - Username must start with a lowercase alphabetical character
  - Username must only contain [a-z] [0-9] [-,_] characters
- Enter the **Full Name** of the User.
- Enter the **Password**, conforming to the password security rules as listed below:
  - Password must be between 8 and 199 characters in length.
  - Password must contain:
    - 1 character from [a-z]
    - 1 character from [A-Z]
    - 1 digit from [0-9]
    - 1 special character from the set [$%@!&]

- **Re-enter Password** and click **Confirm**.



RESULT: Pop-up window appears showing the **Operation Status**, click **OK.**

NOTE: defadmin account will be removed the next time you login with the newly-created user and are signed out of all defadmin sessions.



6. Navigate back to the main menu by clicking on the **HOME** link located at the upper left corner of the page.

NOTE:

- The defadmin user will be deleted automatically once nominated administrator-level user is logged in and all the defadmin opened sessions are logged/signed out.
- The root user is available to recover the new administrator password.

Task 3: Set the Network Ports Parameters (IP Address, SFP)

Network Ports #1 and #2 are always available, #3 and #4 are pluggable SFP.

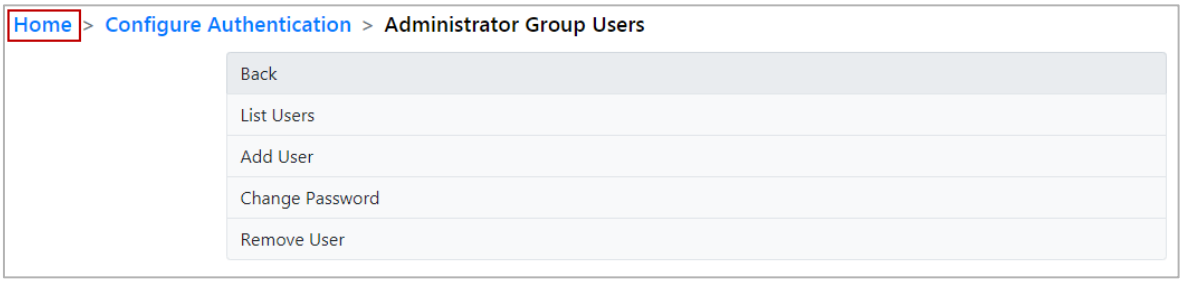
Each SFP adapter must be configured to match the inserted type.

The default enabled and configured Network port is #1, with 192.168.168.81/24 and can be used as such.

If is required to change the default IP Address, and/or to configure additional network ports, please follow the steps below using Settings GUI.

Setting Network Ports #1 and #2 (embedded ports)

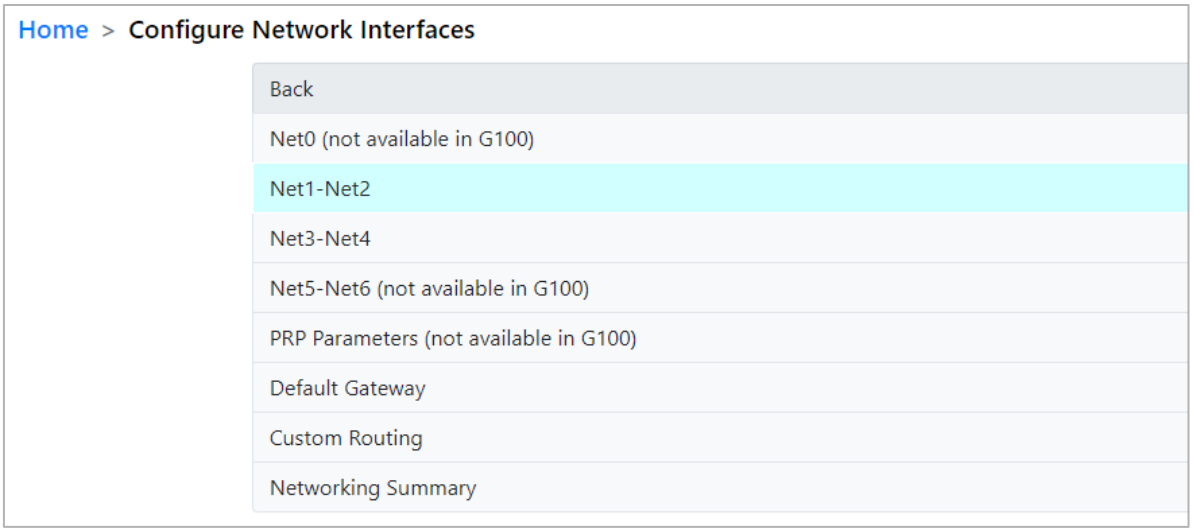
1. If not already in **Home** screen, go the Settings GUI main menu by clicking on the **HOME** link located at the upper left corner of the page. See the screen below.



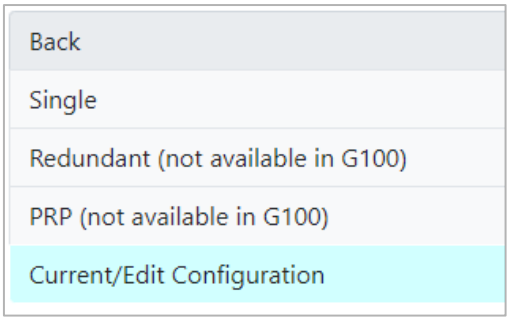
2. Select **Configure Network Interfaces** tab from the main menu.

   Note: This screen will have additional options after a nominated administrator user was created and logged on.

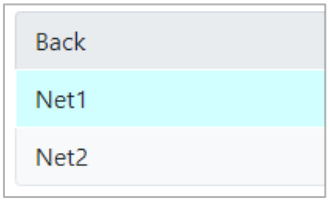
3. Select the network interfaces **Net1-Net2**.



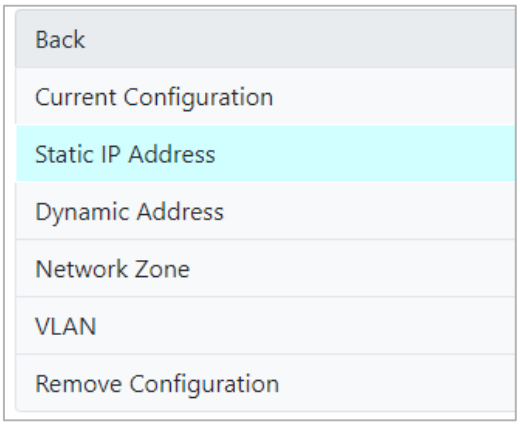
4. Only **Single** mode is supported in G100.
5. Select **Current/Edit Configuration** tab.



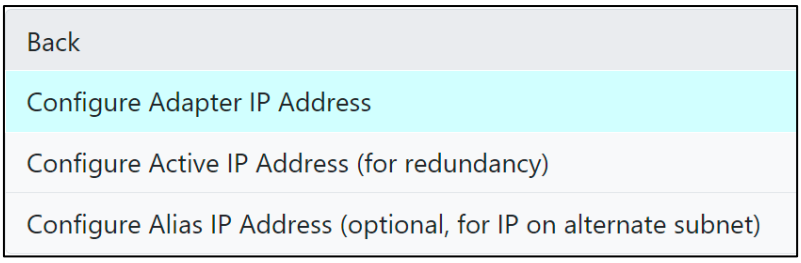
6. Select **Net1** tab (or **Net2** as desired).



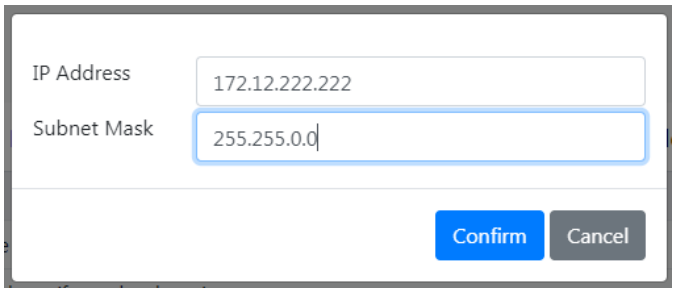
7. Select **Static IP Address** tab.



8. Select **Configure Maintenance IP Address** tab.

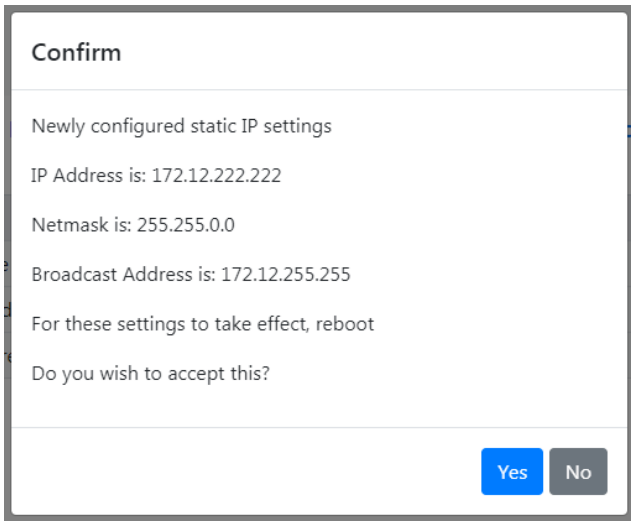


9. Enter **IP Address** and **Subnet Mask**. Click **Confirm**.



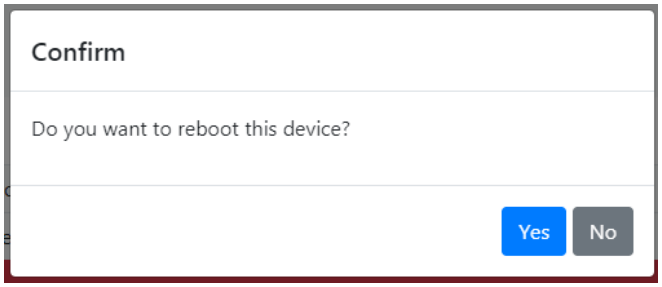
Click **Yes** to confirm the newly configured static IP settings.

NOTE: Reboot the device for changes to take effect.



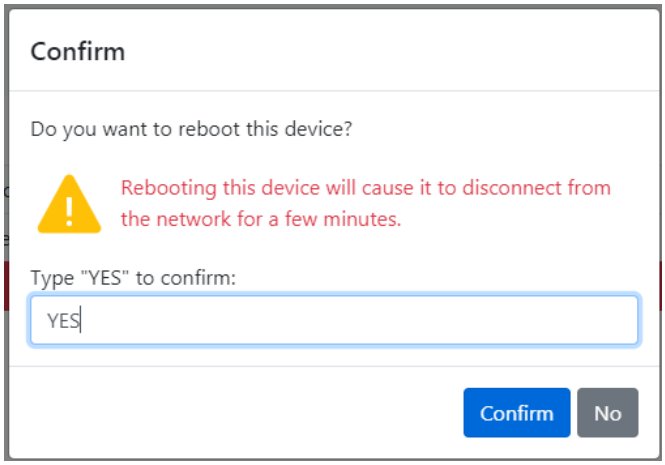
10. Navigate back to main menu and select **Reboot Device** tab.

11. Click **Yes** to confirm Reboot the device.

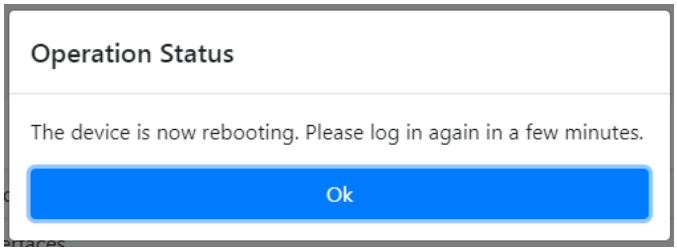


12. Type "**YES**" and click **Confirm**.

    NOTE: Rebooting the device will cause it to disconnect from the network for a few minutes.



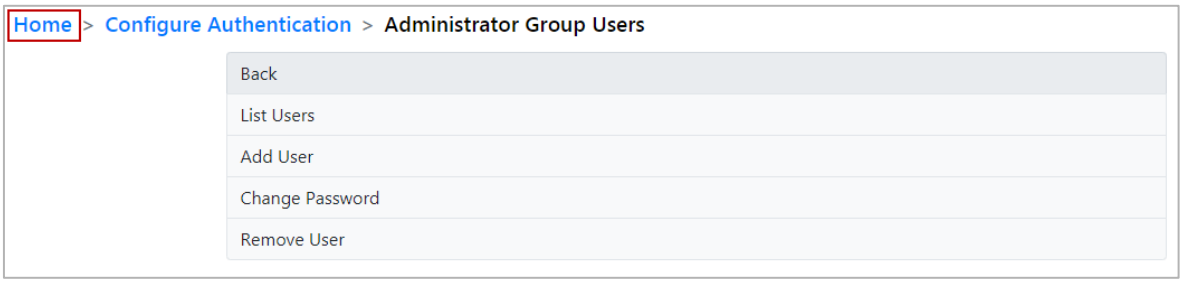
    RESULT: The device reboot takes place. Click **OK**.



Setting Network Ports #3 and #4 (SFP)

The process to configure the IP Address is identical as for Network Ports #1 and #2, with the addition of the SFP selection for #3 and #4.
The G100 must be restarted after changing the SFP type(s).

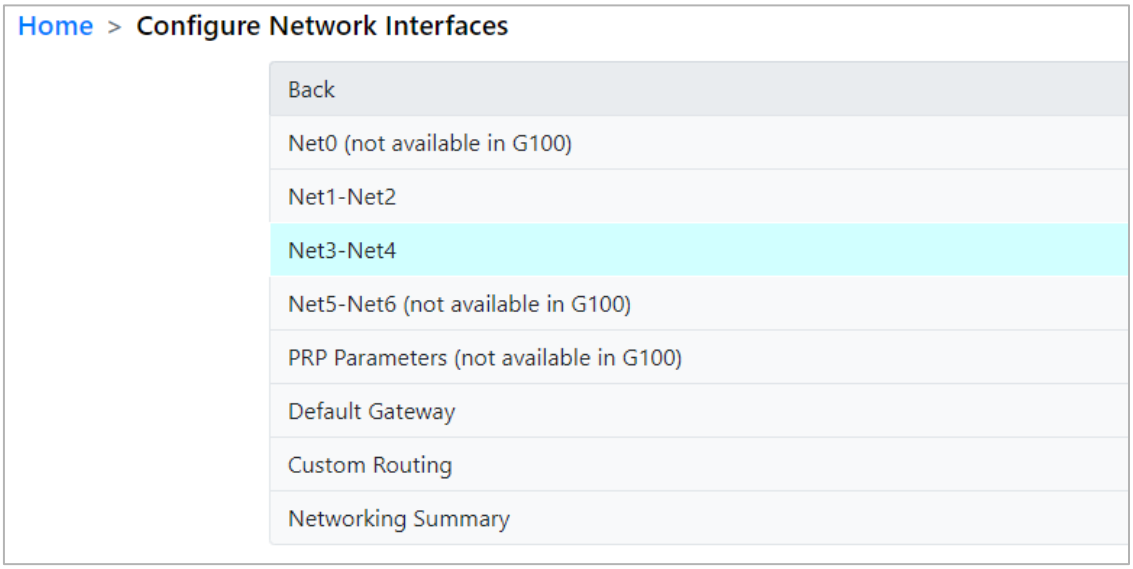
1. If not already in **Home** screen, go the Settings GUI main menu by clicking on the **HOME** link located at the upper left corner of the page. See the screen below.



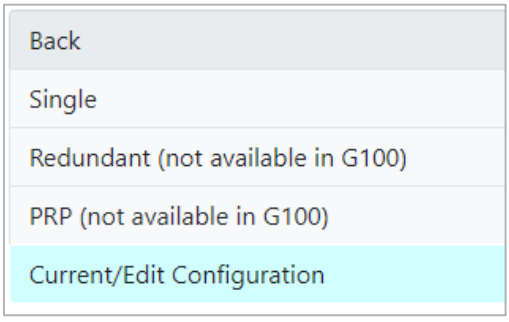
2. Select **Configure Network Interfaces** tab from main menu.

   Note: This screen will have additional options after a nominated administrator user was created and logged on.

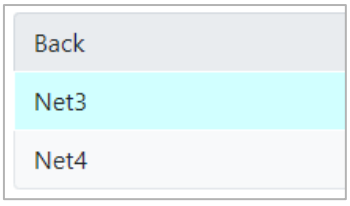
3. Select the network interfaces **Net3-Net4**.



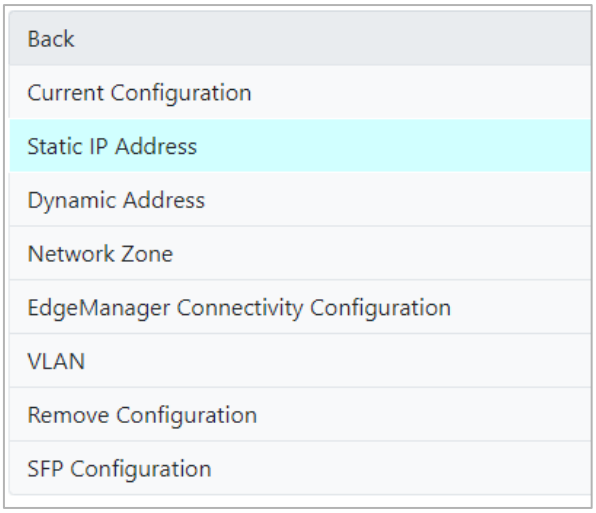
4. Only **Single** mode is supported in G100.
5. Select **Current/Edit Configuration** tab.



6. Select **Net3** tab (or **Net4** as desired).

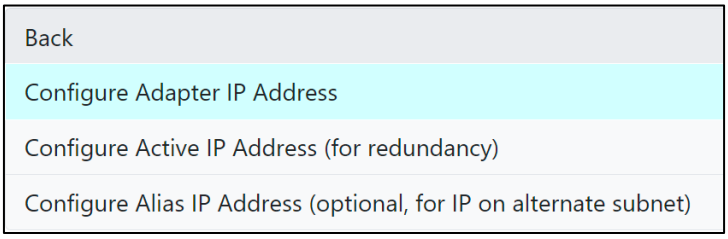


7. Select **Static IP Address** tab.

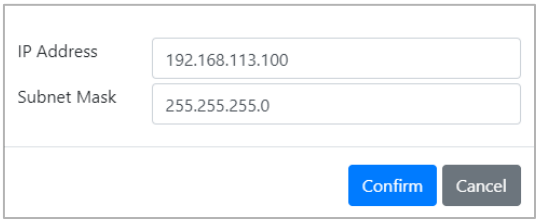


INFORMATION NOTE: The option “EdgeManager Connectivity Configuration” is available for all network ports except #1 which is reserved for the Predix Edge Technician Console (PETC).

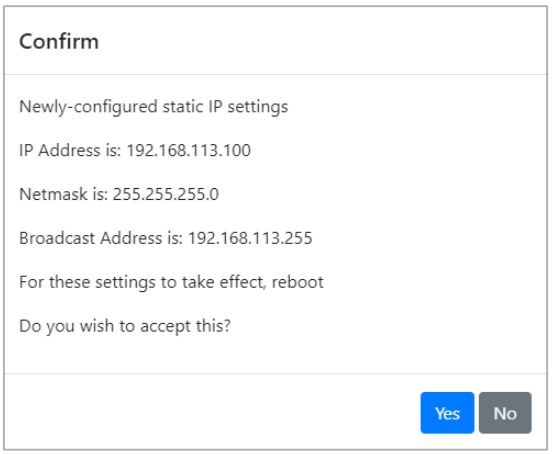
8. Select **Configure Maintenance IP Address** tab.



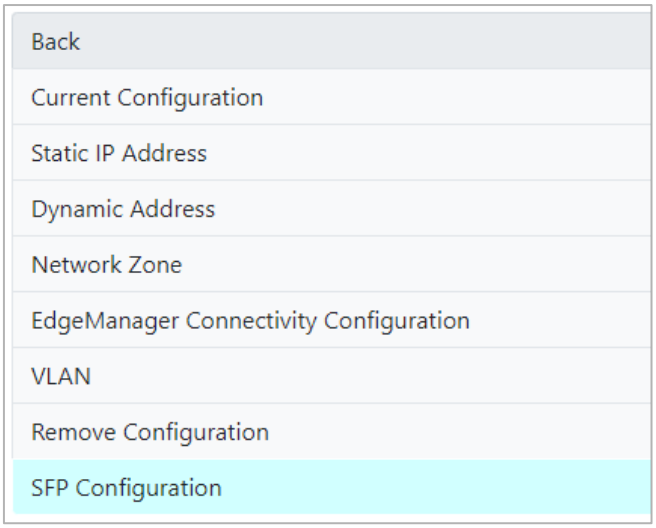
9. Enter **IP Address** and **Subnet Mask**. Click **Confirm**.



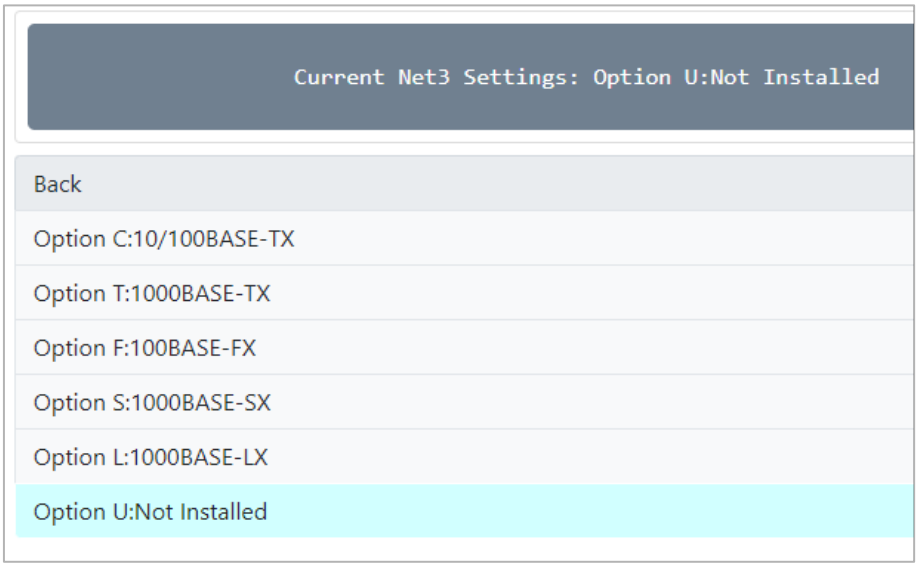
Click **Yes** to confirm the newly configured static IP settings.



10. Navigate back to the network edit configuration and select **SFP Configuration**.

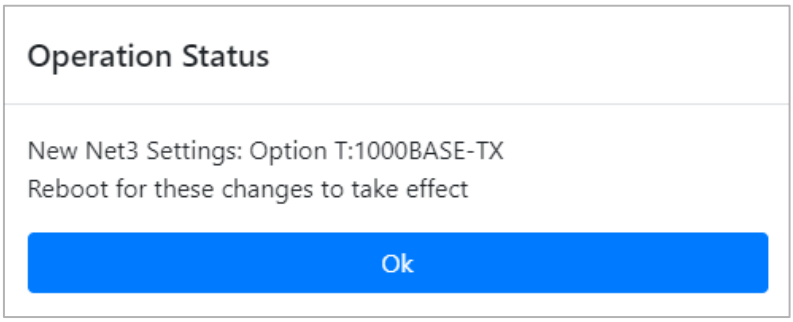


11. Select the option corresponding to the SFP adapter type inserted in the SFP slot for this port.

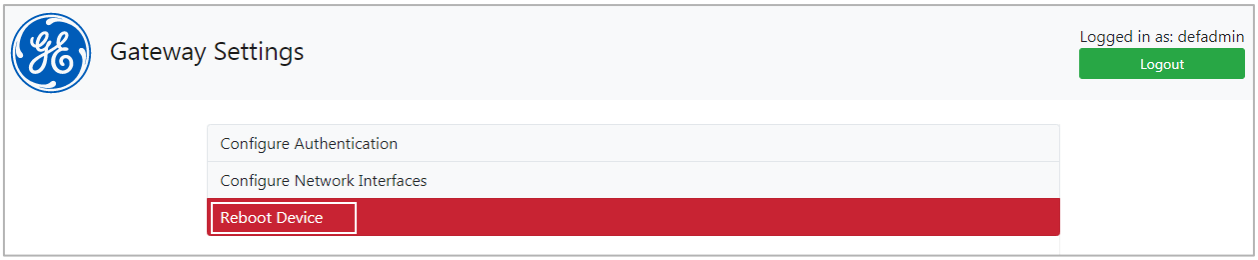


Default option is **U** (not installed).

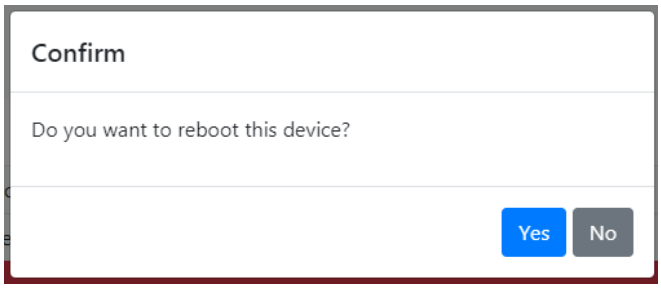
Select **OK** to acknowledge the selection.



12. Navigate back to main menu and select **Reboot Device** tab.

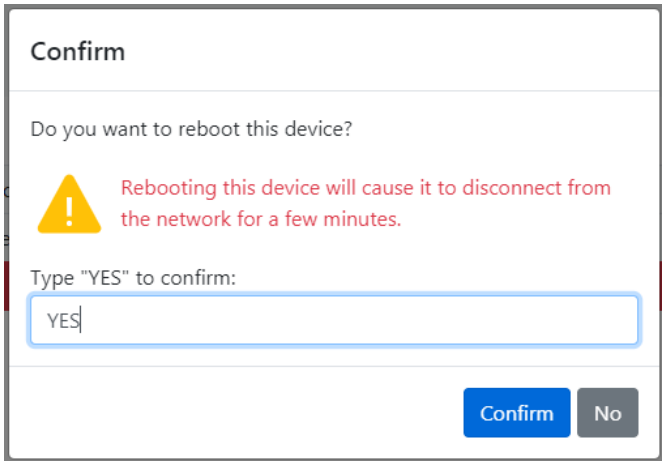


13. Click **Yes** to confirm Reboot the device.

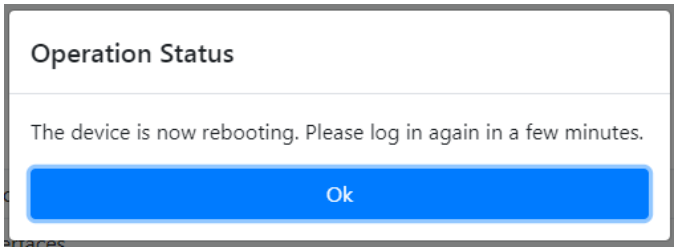


14. Type "**YES**" and click **Confirm**.

NOTE: Rebooting the device will cause it to disconnect from the network for a few minutes.



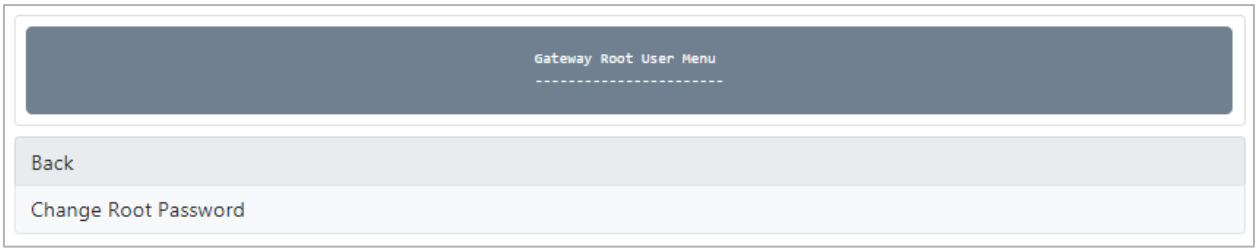
RESULT: The device reboot takes place. Click **OK**.



Task 4: Change the Root Password

1. Go the Settings GUI main menu by clicking on the **HOME** link located at the upper left corner of the page.
2. Click the **Root Administrator Settings** tab.

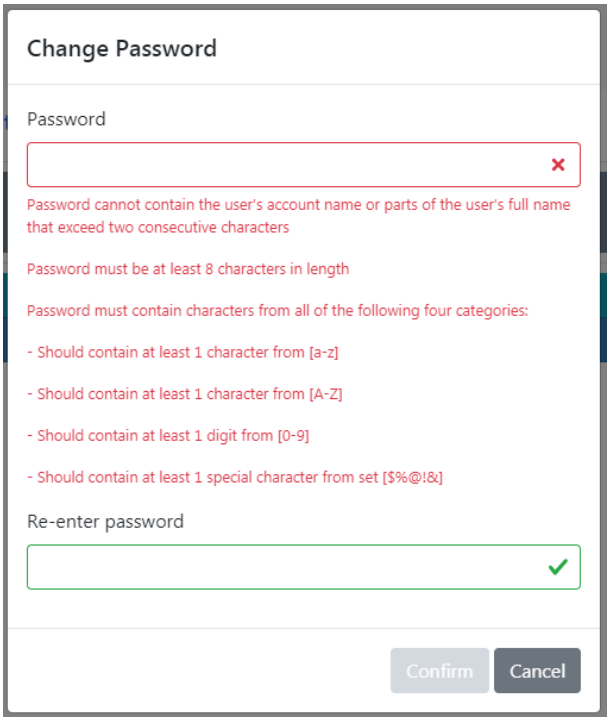
3. Click the **Change Root Password** to change the password associated with the system root user account.



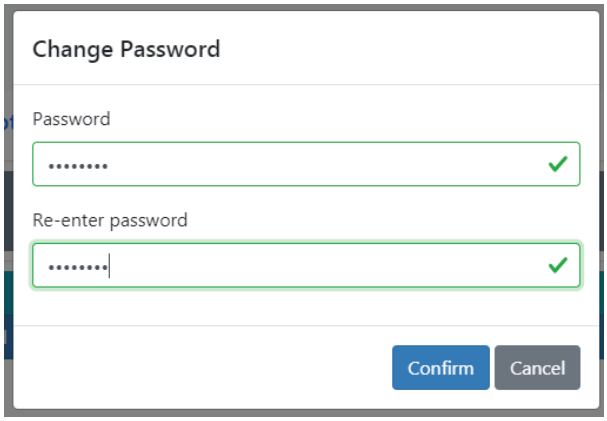
4. Change Root Password:

   - Password cannot contain the user's account name or parts of the user's full name that exceed two consecutive characters.
   - Password must be at least 8 characters in length.
   - Password must contain characters from all the following four categories:
     - Should contain at least 1 character from [a-z]
     - Should contain at least 1 character from [A-Z]
     - Should contain at least 1 digit from [0-9]
     - Should contain at least 1 special character from set [$%@!&]

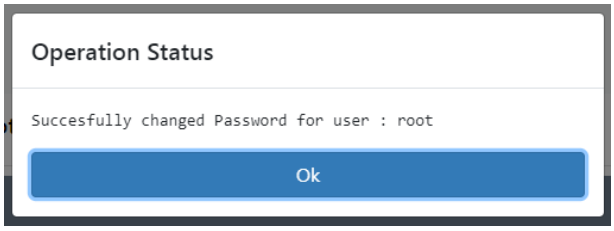
- Re-enter password.



5. Click **Confirm.**



RESULT: Pop-up window appears showing the Operation Status, click **OK.**



NOTICE The root user's password should be defined and securely stored by the system administrator; This is crucial information. **No method is available for recovery** outside the factory.

Task 5: Download existing G100 Configuration

Follow the below steps to download the G100 project in DS Agile Studio:

1. Launch the **DS Agile MCP Studio**.
2. Connect to the G100 from the ethernet port used for maintenance (default is #1 using 192.168.168.81/24).
   See **Task 3**.
3. Login with the new nominated administrator user and password.
   See **Task 2**.
4. Select the desired G100 configuration and select the **Synch To** button.
   Follow the steps as prompted on the screen.

Converting D400 configuration to G100

DS Agile MCP Studio can restore D400 archives created in **SGConfig**.

D400 offline devices with v530 configuration or newer can be directly converted to G100. Previous D400 versions need to be first upgraded to v530 using the D400 Upgrade Manager.

Launch DS Agile MCP Studio.

1. If you need to obtain the D400 configuration from an existing operational unit - connect to D400 device and use **Sync From** to upload the configuration.
   Alternatively, select the existing D400 offline configuration to be converted.
2. With the D400 device selected, select the **Create G100** button in the menu. Follow the prompts.
3. When the conversion is complete, the new configuration can be saved and downloaded to the G100 using the **Sync To** option.

Setup G100 - With a Snapshot

Task 1: Connect to the G100

1. Connect a **LAN cable** between your computer and the G100 maintenance LAN port.
   The PC's network settings will have to be configured to the same subnet as the G100 to establish communications.

Task 2: Restore Snapshot to the G100

1. Launch the **DS Agile MCP Studio** on the local configuration PC.
2. Restore your G100 snapshot to a device in a project in DS Agile MCP Studio (**Archive** > **Restore Snapshot to Device**).
3. Edit the IP address in the device properties to match the default G100: 192.168.168.81
4. Select this device, initiate **Synch To Device** > **Restore Snapshot to Device**
5. Select all Restore options
   - Restore Configuration Data
   - Restore Network Settings
   - Restore information required to clone a device

6. If used, enter the Optional Password – This is the password selected when saving the snapshot, not the password on the G100. This feature will verify the Snapshots authenticity and allow restoration of confidential data from the snapshot image (if was saved when the snapshot was created).
7. Login with the default admin user:

   - Username: defadmin
   - Password: defadmin

   Refer to **DS Agile Studio User Manual** for more details. Follow the steps as prompted on the screen.
   Result: After successfully restoring the snapshot, the G100 will restart and finish applying the changes. G100 runs with the same settings and configuration created for previous snapshot.
   You can now change the Projects device properties IP address set in ***Step 3*** as desired, to match the restored configuration running in G100.

Checking Licenses

G100 units are factory licensed.

To check the provided licenses, two workflows are provided:

1. Shell access-based workflow (read only)
2. DSAS based workflow

Shell access-based workflow (read only)

For G100:

1. Start a **terminal session** and log into the G100 with an Administrator-level or root user account.
2. At the G100 #>> prompt, enter the following commands:

   - cd /home/MCP_APPS/
   - sudo ./swlic-report

   Result: The application output shows the G100 ownership information and a list of available features.
   Each item under **Application License** represents an application or feature that can be licensed.
   They are shown in the format: Application ID number: Description of feature | License status

```
License Report Utility v01.000

License Information
============================================================
Target Unit                    : MCP
Serial Number                  : 12345678
Customer                       : GE MULTILIN
License created from           : License Utilities V1.0.4

Application License            Status
```

```
============================================================
000 : MCP Core                  Unlocked
001 : Remote Desktop HMI        Unlocked
002 : ARRM                      Unlocked
004 : 61850 Client              Unlocked
008 : 61850 Server              Unlocked
016 : LogicLinx                 Unlocked
064 : TEJAS V Server            Unlocked

Container License               Status
============================================================
No container licenses found
```

If the G100 unit does not contain a license file, perform the following steps:

1. Start a **terminal session** and log into the G100 with an Administrator-level or root user account.
2. At the G100 #>> prompt, enter the following commands:
   - cd /home/MCP_APPS/
   - sudo ./swlic-info
3. Provide the information shown to GE Vernova Technical Support.

Refer to MCP Software Configuration Guide (*GE Vernova Part Number SWM0101*) for more details.

For D2X function inside G100:

NOTICE **D2x License files can be deployed to G100 v4.00 – however the D2x functionality is not present in G100 v4.00.**

DSAS based workflow

Users have the possibility to **read/extract/apply** licenses to G100 using the Licensing option available in the DSAS Configuration Tool. Same screen and workflow applies to both MCP and D2x Licenses.

To access these options:

1. Open **Device Properties** for your DSAS offline Device in your Project. If one was not created, please follow the normal workflow to create one.
2. Go to the **Licensing** tab.

3. Under License Management there are the following buttons:
    a. Read License
    b. Extract License
    c. Apply License
    d. Refresh License Information
4. When user clicks on any of the buttons, a login dialog is prompted to connect to G100 with **Administrator privileges** (this role is required to access any of the licensing information).
5. After successful authentication, user is authorized to access the license information. If the user stays within this tab, subsequent button actions will not prompt again to login.

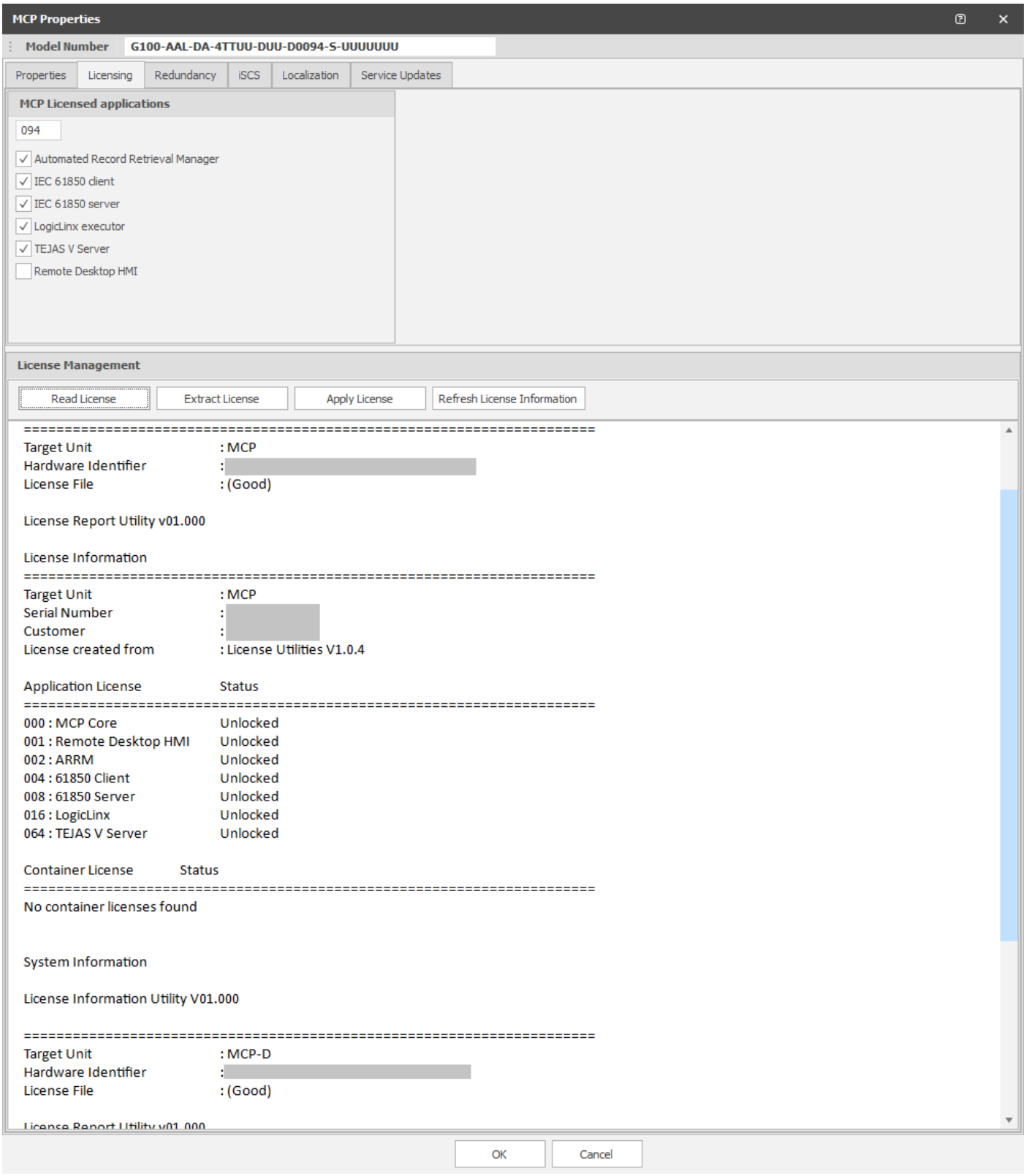
For D2X function inside G100:

NOTICE **D2x License files can be deployed to G100 v4.00 – however the D2x functionality is not present in G100 v4.00.**

Read License

This option displays the license information of the live target unit (connected G100 device), for both the MCP and D2x (if present) licenses, and regardless of the selected function.

Displayed information may be copied to the Windows Clipboard with regular actions (mouse click and drag or CTRL+A to select, right click or CTRL+C to copy).



Extract License

This option allows user to extract the current license file from the live target unit to a specified PC location, for example to archive a copy.

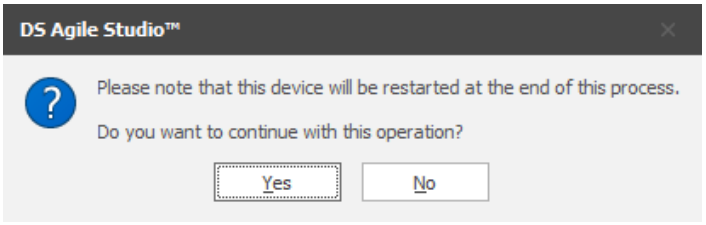
The extracted license file is saved as a *.key file (default name is license but can be changed as desired).

This applies to both MCP and D2x licenses (if present).

Apply License

This option allows user to apply a compatible license key, from a location in the PC, to the live target unit.

NOTE: The live target unit is restarted at the end of this process, not immediately, and only if a hardware compatible license file was selected.

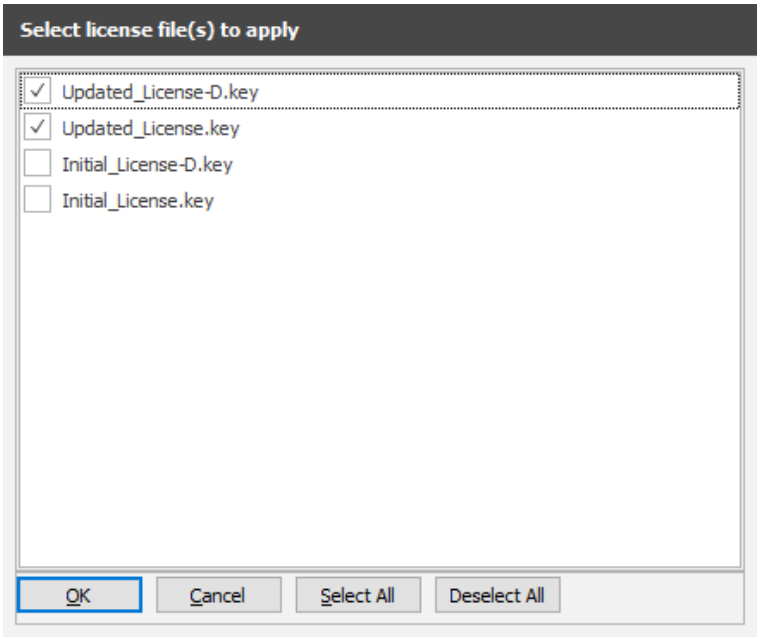


When browsing for license files, user must select the folder containing one or more license files. The action does not include sub-folders of the selection.

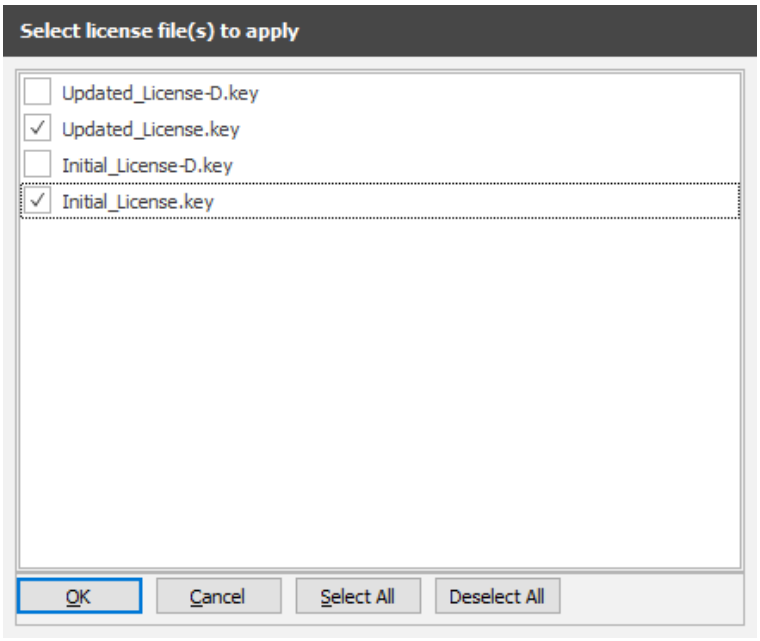
In the resulting dialog only license files (any filename) that match the Hardware Identifier of the live target unit are displayed for selection. This is the reason why users must first login to the live device as Administrators.

Both MCP and D2x license files are shown, the D2x ones typically end in -D (if present).

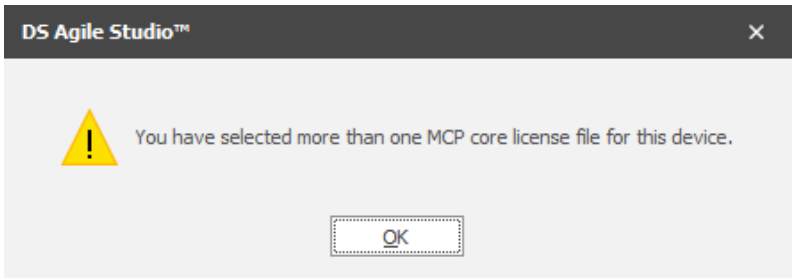
Maximum one MCP and one D2x license can be selected at same time.



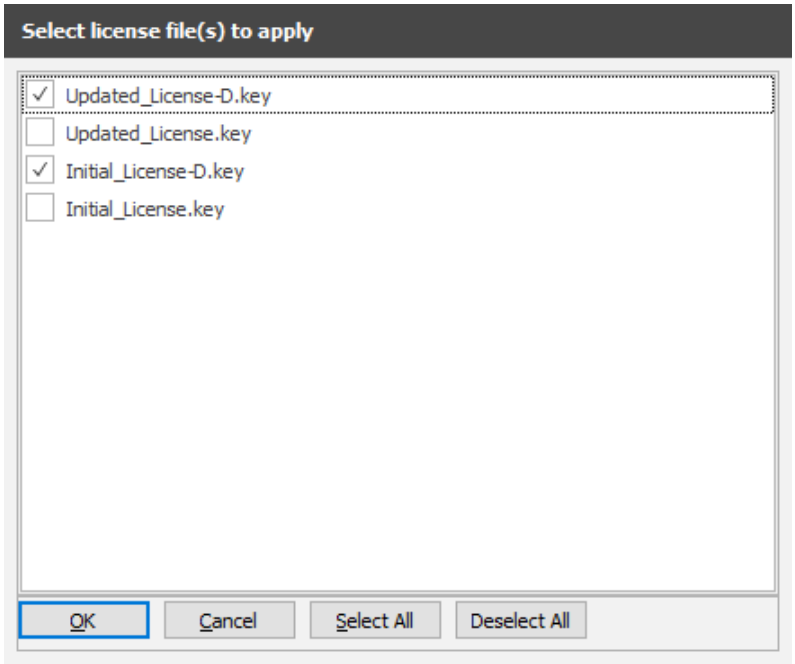
If multiple licenses of same type are selected a dialog prompts the user to re-select.



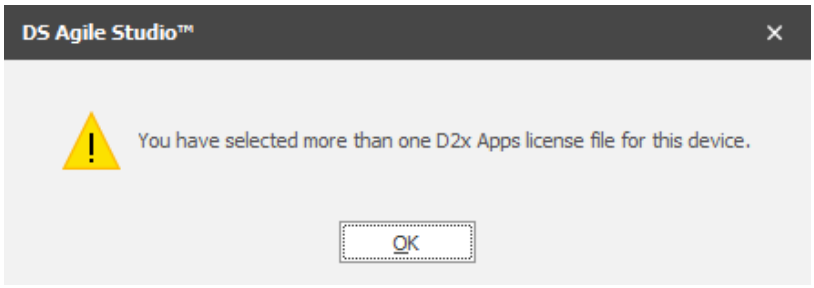
Results in:



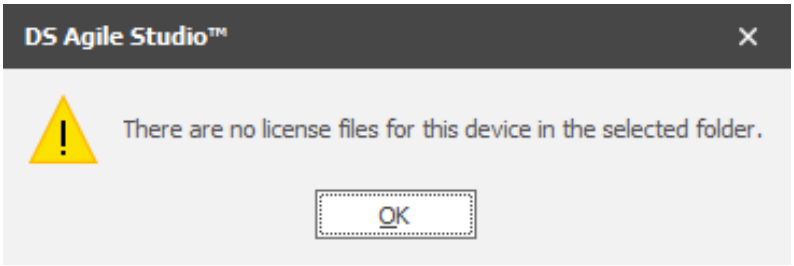
Or:



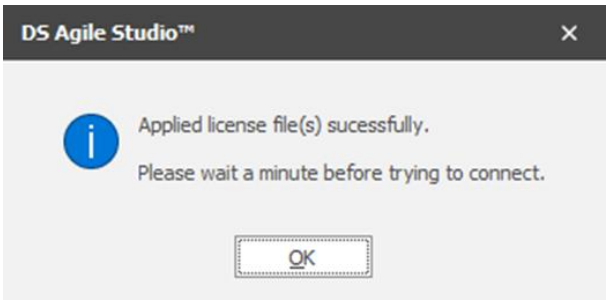
Results in:



If the selected folder has no license compatible with the connected live unit, an information dialog is presented to this effect:



If a valid license file has been selected it will be applied and the device restarts:



The workflow to apply a license can be cancelled at any time before selecting a valid license and click **OK**.

Refresh License Information

Refresh License Information should be used only when license.key file has been deployed to target device outside of DSAS and the device was not yet restarted - causing DSAS to not be able to read the license information.

Read the G100 Order Code

To know the Order Code of your G100, run ***mcpsi*** command through the Shell access.

“As-Built” is the order code at factory build time.

“As-Is” is the order code at the time when the user runs the command.

In the example below, after the unit was built in the factory, there were added and configured two Fiber Optic SFP (F) and a D.20 PCIe card (D), and the firmware version was upgraded to 4.00.

Starting with version 4.00 the G100 Order Code contains additional digits at the end for D2x tracking. Refer to MCP Software Configuration Guide (*GE Vernova Part Number SWM0101*) for more details.

```
admin@G100:~$ mcpsi
Retrieving the GE Multilin MCP system information, please wait ...
================================================================================
                      GE Multilin MCP System Information
================================================================================
Model Number:
    As-Built:      G100-AAL-DA-4TTUU-UUU-B2022-UU
    As-Is    :      G100-AAL-DA-4TTFF-DUU-D0070-S-UUUUUUU
```

G100 as D2x Function

This is not available in V4.00

Visit the online store for application licenses ordering codes. For latest configuration and options, please visit the online store and search for G100:

https://store.gegridsolutions.com/Home.aspx

UEFI Settings checks

Refer to Configuring UEFI Settings on G100 User Guide (*GE Vernova Part Number SWM0122*) for details.

G100 device has the following UEFI settings

These UEFI settings are applicable only while the G100 is starting.

After the applications started, these settings are over-written by the values configured in *MCP Local Configuration Utility (mcpcfg)* or *MCP Settings GUI*.

- Default Serial Maintenance Port used as UEFI (boot) console when KVM is not available (Advanced->Serial Port Console Redirection).
    - Console Redirection is set to Disabled for COM1-COM3, please do not change these settings.
    - Console Redirection for COM4 should be enabled/disabled and have the “Bits per second”, to be same as in the Serial Maintenance Port in MCP Studio (refer to MCP Software Configuration Guide (*GE Vernova Part Number SWM0101*) for more details.
- Default Serial Ports Modes (Advanced->Super IO Configuration)
    - Ensure are enabled/disabled as required for secure hardening purposes and set to RS-232.

MCP Runtime HMI

MCP Runtime Human Machine Interface (HMI) is available to view real time information on G100. With the HMI a user has the option to monitor the status of a substation network, view data, execute control commands and change the system set-up.

The MCP Runtime HMI is available on a local monitor (via the display ports on the rear panel of the G100) and on remote PC's as a standalone application.

The Local Runtime HMI (KVM) is already installed in the G100.

The remote MCP Runtime HMI runs as a standalone application.

Install MCP Runtime HMI

The remote MCP Runtime HMI requires **Windows x64** bit OS. This is available via GE Vernova support channels and consists of a single installation file named **SetupMCPHMI_x64_v.*abc*.exe** – where ***abc*** represents the version (this must match the G100 firmware version).

Note: Installation of Java/JRE on the Windows PC is not required.

To install the MCP Runtime HMI:

1. Run the **SetupMCPHMI_x64_vabc.exe** install file.
2. Select **OK** at the Windows security prompt.
3. Select **Next** in the installation wizard.
4. Select **Finish** to complete the install.
5. Launch the MCP HMI from the Start Menu or open from the install folder.

Install Location: C:\Program Files\MCP Runtime HMI*abc*\MCPHMI_x64_v*abc*.exe

Refer to MCP Software Configuration Guide (*GE Vernova Part Number SWM0101*) for more details.

Accessing Remote HMI

1. Double click the **MCPHMI_x64_v4.0.exe** file <shortcut> or launch from the start menu.
2. Enter the **IP address** of the G100 (assigned in Task 3).
   - The TCP port of the MCP HMI is always 443. If you need to use a different TCP port, due to routing rules existing between the PC and G100, you may enter it in the form of IP: TCP, for e.g. 10.10.11.50:30500
3. Login with the user credentials created in Task 2: Create a New Administrator User.
4. Click **Login**.

   NOTE: Users can be assigned with different HMI access levels. Refer to MCP Software Configuration Guide (*GE Vernova Part Number SWM0101*) for more details.

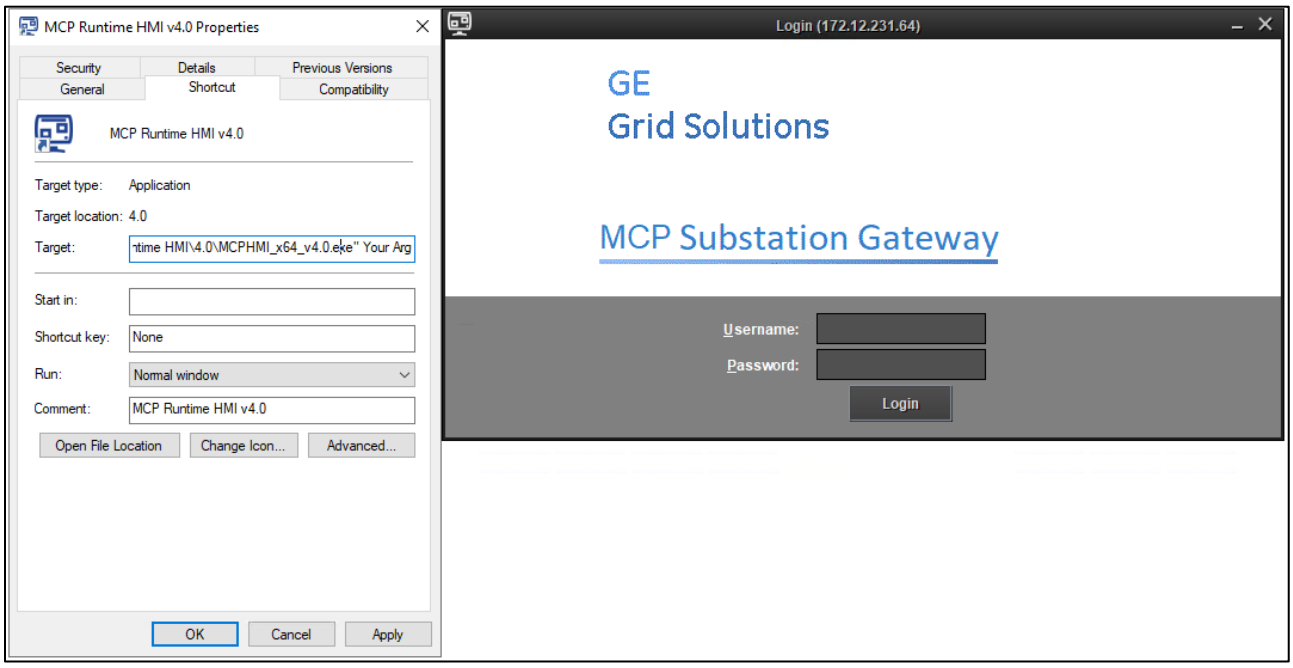
Remote HMI Auto Login

By customizing a MCP Runtime HMI shortcut the user can predefine the login User, IP Address, or Remote Port.

1. Locate the MCP Runtime HMI shortcut.
2. Copy the shortcut to the desktop, or a desired location, or pin it to Taskbar or Start Menu.
3. Right click on the shortcut and select **Properties**.

4. Add the below parameters to the shortcut at the location **Target** as shown in the below table:

Target Parameters	Shortcut Target content
IP Address	C:\Program Files\MCP Runtime HMI\4.0\MCPHMI_x64_v*4.0*.exe -host 192.168.168.81
IP address & Port (e.g. for local port re-direct)	C:\Program Files\MCP Runtime HMI\4.0\MCPHMI_x64_v*4.0*.exe -host 127.0.0.1 -port 30500
Only User Name	C:\Program Files\MCP Runtime HMI\4.0\MCPHMI_x64_v*4.0*.exe -username admin1
Shortcut with All Parameters	C:\Program Files\MCP Runtime HMI\4.0\MCPHMI_x64_v*4.0*.exe -host 192.168.168.81 -port 30500 -username admin1



Note: The shortcut properties will display the updated **Target** data launches the HMI with the IP and pre-defiled Username.

5. Double click the newly created shortcut to launch the MCP Runtime HMI using the parameters configured in the Target.

Accessing Local HMI

1. Local HMI starts automatically when a monitor is connected to the MCP display port on startup.

   If the G100 is configured for **Auto Logon**, then the MCP Home Page is launched with the configured user privileges on startup.
2. When prompted, login with the user credentials created in Task 2: Create a New Administrator User.
3. Click **Login**.

NOTICE

When finished your work it is suggested to logout from the G100 Local HMI to secure the system. Logging out terminates the respective user session with the G100 and closes all G100 Local HMI displays and windows.

The internal G100 alarm buzzer is active only when the Local HMI runs. Create a default auto logged on Observer user if the internal alarm buzzer is required to operate in un-attended mode, and ensure the Local HMI is not shut down.

Configure Screen Layout

1. Screen Layout and resolutions may be configured using Screen Layout utility in the Local HMI.
2. The utility can be launched from Local HMI start menu using **Start** > **System** > **ScreenLayout.**
3. The minimum resolution supported in Local HMI is 1280x1024 and the recommended is FHD (1920x1080 or higher).

Configuring Monitor Layout

G100 Local HMI supports up to 1 monitor using its display port Display Port.

Refer to MCP Software Configuration Guide (*GE Vernova Part Number SWM0101*) for more details.

Runtime HMI User Preferences

HMI Runtime (Remote/Local) supports the following features. These features are available from the **User** tab of the Power Bar.

Mode of Operation

- Docked → all windows open within the parent frame.
- Single → A single window is opened at a time in the parent frame, new windows replace the previous page.
- Floating → All windows open as independent windows in the desktop area (no parent frame).

Persistency

Windows Persistency is a default feature in Runtime HMI (Remote/Local) which maintains the following independently for each user:

- Persistence of sorting order of the columns, column filters, column width in all the tabular screens or windows.
- Vertical and horizontal re-sizing of all layout boundaries between screen areas of same screen.
- Size and position of all windows in floating mode, except location of child pop up dialogs.

NOTE: Use Reset Persistency option in the Runtime HMI Preferences to clear the persistency state of the windows for the current or all users, or when changing to a lower screen resolution and your persisted windows exceed the screen space. Refer to MCP Software Configuration Guide (*GE Vernova Part Number SWM0101*) for more details.

List of factory default open ports – TCP and UDP

For more details about the open port numbers and protocols, refer to **SWM0101 Appendix H.**

Additional Documentation

For further information about the G100, refer to the following documents:

- *G100 Substation Gateway Instruction Manual (994-0155)*
- *MCP Software Configuration Guide (SWM0101)*
- *Configuring UEFI Settings on G100 User Guide (SWM0122)*

Product Support

If you need help with any aspect of your GE Vernova Grid Solutions product, you can:

- Access the GE Vernova Grid Solutions Web site
- Search the GE Vernova Technical Support library
- Contact Technical Support

GE Vernova Grid Solutions Web Site

The G100 Web site provides fast access to technical information, such as manuals, release notes and knowledge base topics.

Visit us on the Web at: https://www.gevernova.com/grid-solutions/

GE Vernova Grid Solutions Technical Support Library

This site serves as a document repository for technical information, such as manuals, release notes, and software. To *get* access to the Technical Support Web site visit us on the Web at:

https://www.gevernova.com/grid-solutions/events/signup.asp?sid=208

Contact Solutions Technical Support

For help with any aspect of your GE Vernova Grid Solutions product, please contact our support team, 24/7, as follows:

Region	E-mail	Telephone
Global Contact Centre	GA.support@GEVernova.com	+44 1785 250070
Central, East Asia, Pacific	GA.supportCEAP@GEVernova.com	+65 6749 0777
India	GA.supportIND@GEVernova.com	No Phone Line
Middle East, North Africa, Turkey	GA.supportMENAT@GEVernova.com	+971 4 375 6950
Europe, Russia, CIS, Sub-Saharan Africa	ERCIS: GA.supportERCIS@GEVernova.com France: SAM_Aftersales@gevernova.com Poland: support.PLS@gevernova.com Russia: support.AMR@gevernova.com (not in use) UK: support.AGS@gevernova.com	+34 94 4858854
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Modification Record

Version	Revision	Date	Change Description
1.00	0	11th May, 2021	Created.
	1	18th May, 2021	Added UEFI Settings checks
3.00	0	30th March, 2023	Added Redundancy in **G100 Snapshot Management** Section. Modified a screenshot in **Task 3** and **Setting Network Ports #3 and #4 (SFP)** sections. Added **Refresh License Information** content in the **DSAS based workflow** section. Added a table reference for **SWM0101 Appendix H** and removed "List of factory default open ports – TCP and UDP" section. Updated to reflect that UEFI settings are retained even after super cap discharges. Removed **Secret Signature**.
4.00	0	28th March, 2024	**GE Vernova** Logo is added on the first page. In **Shell access-based workflow (read only)** section: • D2x Legacy is changed to Tejas V Server • Added a **Notice** for D2x Function inside G100. In **DSAS Based Workflow** section: • Updated the Read License and Apply License sections with screenshots to show the latest licenses for V4.00 Updated the **Read the G100 Order Code** section. Updated the **MCP Runtime HMI** section.
	1	15th May, 2025	Updated to GE Vernova style. Updated GE Vernova email addresses and phone numbers in Contact Technical Support section.