

## G5 Upgrade Tool

**Applies to:** G5 Power Distribution Units

**Objective:** Perform automated operations to PDUs: firmware upgrade, common configuration upload (conf.ini) and per-PDU customized configuration (config.csv).

**Pre-requisites:**

- Panduit G5 PDU
  - g5-upgrade-tool.zip
  - g5-upgrade-tool.exe
  - pduReleases directory.

Use of this software is subject to the terms of the Panduit EULA:

<https://www.panduit.com/content/panduit/na/en/legal-information/end-user-license-agreement.html>

### Description

The G5 Upgrade Tool automates three functions useful for managing one or more G5 PDUs.

- Apply a Firmware Upgrade
  - Apply a common configuration (conf.ini)
  - Apply unique per-PDU configuration (config.csv)

### Support

Please report issues with this software to Panduit Customer Support: [support@panduit.com](mailto:support@panduit.com).

### Usage

The application window layout has these primary areas:

- Window title bar: shows the path to the open/saved configuration and the name: G5 Upgrade Tool.
- Menu bar: lists short cuts and common functions.
- Left-top: the Configuration entry area.
- Middle-top: Primary functions of the tool and per-function specific configuration/options.
- Right-top: the Device List shows IP Addresses, the function to be performed, and the status of the operation.
- Right-middle: Actions performed on the Device List
- Bottom: Results text area.

The window can be resized and will adjust the user interface elements appropriately.

The menu system has these menus and menu items:

- File
  - Open... : Open a CSV file that uses the G5 Upgrade Tool schema.
  - Save : Save the current configuration to a new file if previously unsaved, or to the same file if previously opened/save.
  - Save as... : Save the current configuration to a new file.
- Edit : This menu provides standard clipboard operations for configuration data entry fields.
  - Cut : cannot be used on the Results field.
  - Copy
  - Paste : cannot be used on the Results field.
  - Select All
- Actions:
  - Select conf.ini: Choose a conf.ini file.
  - Select config.csv: Choose a config.csv file.
  - Start Upgrade : Perform a firmware upgrade function on the configured PDUs.
  - Start conf.ini: Perform an upload of the conf.ini file to the configured PDUs.
  - Start config.csv: Perform an upload of configuration specified in the config.csv file to the configured PDUs.
- Help:
  - Documentation... : this documentation.
  - Licenses... : Panduit and Third Party Open Source Software License disclosures.
  - About G5 Upgrade Tool... : Information about the tool, including the version number.

Note: only one Scan Network and Start Upgrade operation can be performed at a time.

## Common workflow for the G5 Upgrade Tool

**WARNING:** Do not interact with the daisy chain, network connections, button interfaces, FTPS, HTTPS, SSH or SNMP interfaces while this software is in use. Interacting with the PDU that is being upgraded WILL interfere with the upgrade process and cause the process to stop unexpectedly! Restarting the upgrade process without interruption will allow it to complete.

### “Start Upgrade”: Performing a Firmware Upgrade

1. Run the g5-upgrade-tool.exe by double clicking it.
2. Choose the “Add Device” or “Scan Network” notebook tab.
3. Enter the required paramters.
  - a. Scan Network uses ICMP Ping and SNMP v2 Read Community string to identify only G5 PDUs and adds them to the Device List.
  - b. Add Device just adds the device to the Device List. It does not verify the IP Address is a G5 PDU nor that it is reachable.
4. Click the “Add Device” or “Scan Network” button. The result of the operation is shown in the Results text area.
  - a. Note: “Add Device” and “Scan Network” are not used with “Start config.csv”.
5. Enter the UserName and Password for SSH/HTTPS.

- a. Note that the tool will read in a Password if one is provided, but will NOT Save the Password back to the file.
6. Choose a function:
  - a. Apply a Firmware Upgrade to chosen PDUs: Choose the desired Firmware Version. By default, the newest version is selected. Next, click “Start Upgrade”.
  - b. Apply a conf.ini (common configuration) to chosen PDUs: Click “Select con.ini”, locate a conf.ini file to be uploaded to all chosen PDUs. Next, click “Start conf.ini”.
  - c. Apply a config.csv (unique per-device configuration) to PDUs: Click the “Select config.csv” button and select a config.csv file that defines the PDUs which will be operated upon. Next, click “Start config.csv”.
7. The progress bar thumb will move across the screen indefinitely until the operation is complete. a. Note that PDU upgrades take several minutes to complete. Please be patient. A PDU with max daisy-chain PDUs can take up to 45 minutes to complete firmware update.
8. The Results window shows the current progress of the chosen function.
9. When complete, a line will report: “Upgrade results: 1 PASS, 1 FAIL, 0 previously passed” where the numbers are replaced with the actual status of the operation. a. Note: “previously passed” devices are not upgraded on subsequent upgrade attempts.
10. If any units FAIL, you may click the “Start” button for the same function again. Sometimes there are transient errors. It is safe to repeat any of the “Start” functions of this tool.
11. You may Save or Save as... when the function is complete. The per-device status is preserved in the saved file. a. Note: the per-device status is replaced with ‘ready’ when you Open the file.

### *Firmware Version*

The pduRelease directory contains the supported firmware upgrade paths for this tool. For example, the pduRelease directory may contain:

- pduReleases/2.3.22/PANDUIT.FW
- pduReleases/3.1.10/PANDUIT.FW

To add a new firmware upgrade version:

1. Make a new directory inside the pduReleases directory with the name of the firmware release.
2. Copy the PANDUIT.FW file into the new directory.
3. Start or restart the tool.

### **Start conf.ini: Apply a common conf.ini File to all chosen PDUs.**

The conf.ini file is produced by the G5 PDU.

1. Log in to the web UI.
2. From the Settings menu (gear icon) choose System Management menu item.
3. From the Actions menu, choose Download Config File.
4. The conf.ini file is downloaded. The file contains configuration data.

When this file is uploaded to a PDU, all settings except for the Network settings are applied to the PDU.

## Start config.csv: Perform a Per-device Attribute Configuration:

1. Copy “completeCSV\_g5mvp-template.csv” to a new filename such as “ZoneA-G5config.csv”.
  - a. For each PDU to configure, enter an IP Address in “Cabinet Number”, starting in Column E.
2. Each PDU column must provide configuration values for each Attribute that is being configured.
  - a. Attributes that have multiple valid values use “|” to separate the choices. Example: “DHCP | Static” means the acceptable values are “DHCP” or “Static”.
  - b. Any attribute with a field format that is a string must be entered to be within the maximum length acceptable for that field.
  - c. Any attribute with a field format that is an integer must be entered to be within the valid range of values acceptable for that field.
  - d. Any value field that is an empty string will be skipped/ignored. (You cannot set a field name to an empty string.)
  - e. Any attribute that specifies a PDU, Outlet, Breaker, Sensor, etc instance that is not actively communicating with the PDU is skipped/ignored. eg. If the PDU has a daisy chain of 2 PDUs, but the config.csv specifies a PDU 3, the PDU 3 configuration is skipped/ignored.
3. Delete the entire Row where no change is to be made to that configuration attribute.
  - a. The config.csv file is now ready for use with the G5 Upgrade Tool.

Note: The tool will modify all of the specified configuration settings. If the CSV file chooses to modify these items, the CSV file must be reconfigured later to use the new configuration parameters:

- SNMP v2c community.
- The username and/or password used to apply the changes via ssh & http.

### config.csv (CSV) File Format

Row	Column A	Column B	Column C	Column D	Column E	Column F	...
1	Panduit Detailed Monitoring Device Configuration						
2	1						
3	Cabinet Number				192.0.2.30	192.0.2.31	...
4	CABINET TYPE				Zone A	Zone B	...
5	Network	IP Configuration	Boot Mode	DHCP   Static	Static	Static	...
6+	...	...	...	...	...	...	...

- Row 1: Title
  - Column A contains “Panduit Detailed Monitoring Device Configuration”. This must not be changed.
- Row 2: Version
  - Column A contains “1”. This must not be changed.
- Row 3: Cabinet Number
  - Column A contains “Cabinet Number”.

- Starting in Column E. Each column describes a configuration for a PDU. The “Cabinet Number” used with the G5 Upgrade Utility is the IP Address of the PDU to configure with all of the configuration values in the same column.
- Row 4: Cabinet Type
  - Column A contains “CABINET TYPE”.
  - Column E may be used as a comment on the configuration or use of the configuration. This row is ignored by the software.
- Row 5: Configuration Data
  - Rows 5 and greater describes the configuration values to be applied to the PDU IP address in Row 3.
  - Columns A through D describe the configuration Section, Sub-Section, Attribute, and Field Format of the value to be changed by each PDU starting in Column E. Do not change Columns A through D. The naming convention is similar to what you see in the web interface.
    - Column A: Section
      - The top level menu grouping of configuration.
    - Column B: Sub-Section
      - A second-level grouping of configuration.
    - Column C: Attribute
      - The Attribute to change.
    - Column D: Field Format
      - The format of the Attribute being changed.
    - Column E and higher: Per-PDU configuration values
      - A value to apply to each per-PDU.

### config.csv Notes and Special Cases

- When the Field Format is ‘string’ followed by a number, the number represents the maximum number of characters that can be entered into this field.
- When the Field Format is ‘int’, a reasonable integer value must be supplied. Always double check values first with the G5 PDU web UI to verify the data will be accepted. The config.csv may accept and tolerate invalid values and may not always report errors for invalid or out of range data.
- When a PDU is updated, the Date/Time are set to the local Date/Time of the computer running the G5-Upgrade-Tool.
- The Time Zone is configured with the Network,NTP,Region attribute. It can be configured with three different possible value formats:
  - A Region “Number” integer. eg. 601
  - A Region “Name” string. eg. International Date Line West
  - A Region “Offset” “UTC+##:##” or “UTC-##:##” value. eg. UTC-12:00
- The first found Region is the Region Number that will be configured.
- The Region table follows:

Number	Offset	Name
601	UTC-12:00	International Date Line West

3902	UTC+13:00	Samoa
801	UTC-10:00	Hawaii
901	UTC-09:00	Alaska
1001	UTC-08:00	Baja California
1002	UTC-08:00	Pacific Time (US & Canada)
1101	UTC-07:00	Arizona
1102	UTC-07:00	Chihuahua, La Paz, Mazatlan
1103	UTC-07:00	Mountain Time (US & Canada)
1201	UTC-06:00	Central America
1202	UTC-06:00	Central Time (US & Canada)
1203	UTC-06:00	Guadalajara, Mexico City, Monterrey
1204	UTC-06:00	Saskatchewan
1301	UTC-05:00	Bogota, Lima, Quito, Rio Branco
1302	UTC-05:00	Eastern Time (US & Canada)
1303	UTC-05:00	Indiana (East)
1401	UTC-04:30	Caracas
1501	UTC-04:00	Asuncion
1502	UTC-04:00	Atlantic Time (Canada)
1503	UTC-04:00	Cuiaba
1504	UTC-04:00	Georgetown, La Paz, Manaus, San Juan
1505	UTC-04:00	Santiago
1601	UTC-03:30	Newfoundland
1701	UTC-03:00	Brasilia
1702	UTC-03:00	Buenos Aires
1703	UTC-03:00	Cayenne, Fortaleza
1704	UTC-03:00	Greenland
1705	UTC-03:00	Montevideo
1801	UTC-02:00	Mid-Atlantic
1901	UTC-01:00	Azores
1902	UTC-01:00	cape Verde Is.
2001	UTC+00:00	Casablanca
2002	UTC+00:00	Coordinated Universal Time
2003	UTC+00:00	Dublin, Edinburgh, Lisbon, London
2004	UTC+00:00	Monrovia, Reykjavik
2101	UTC+01:00	Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna
2102	UTC+01:00	Belgrade, Bratislava, Budapest, Ljubljana, Prague

2103	UTC+01:00	Brussels, Copenhagen, Madrid, Paris
2104	UTC+01:00	Sarajevo, Skopje, Warsaw, Zagreb
2105	UTC+01:00	West Central Africa
2106	UTC+01:00	Windhoek
2201	UTC+02:00	Amman
2202	UTC+02:00	Athens, Bucharest, Istanbul
2203	UTC+02:00	Beirut
2204	UTC+02:00	Cairo
2205	UTC+02:00	E. Europe
2206	UTC+02:00	Harare, Pretoria
2207	UTC+02:00	Helsinki, Kyiv, Riga, Sofia, Tallinn, Vilnius
2208	UTC+02:00	Jerusalem
2301	UTC+03:00	Baghdad
2303	UTC+03:00	Kuwait, Riyadh
2304	UTC+03:00	Nairobi
2503	UTC+04:00	Moscow, St. Petersburg, Volgograd
2506	UTC+04:00	Tbilisi
2401	UTC+03:30	Tehran
2501	UTC+04:00	Abu Dhabi, Muscat
2502	UTC+04:00	Baku
2504	UTC+04:00	Port Louis
2507	UTC+04:00	Yerevan
2601	UTC+04:30	Kabul
2701	UTC+05:00	Islamabad, Karachi
2702	UTC+05:00	Tashkent
2801	UTC+05:30	Chennai, Kolkata, Mumbai, Delhi
2802	UTC+05:30	Sri Jayawardenepura
2901	UTC+05:45	Kathmandu
3002	UTC+06:00	Ekaterinburg
3001	UTC+06:00	Astana
3202	UTC+07:00	Novosibirsk
3101	UTC+06:30	Yangon (Rangoon)
3201	UTC+07:00	Bangkok, Hanoi, Jakarta
3302	UTC+08:00	Krasnoyarsk
3301	UTC+08:00	Beijing, Chongqing, Hong Kong, Urumqi
3303	UTC+08:00	Kuala Lumpur, Singapore

3304	UTC+08:00	Perth
3305	UTC+08:00	Taipei
3307	UTC+08:00	Irkutsk
3401	UTC+09:00	Osaka, Sapporo, Tokyo
3402	UTC+09:00	Seoul
3605	UTC+10:00	Yakutsk
3501	UTC+09:30	Adelaide
3502	UTC+09:30	Darwin
3601	UTC+10:00	Brisbane
3602	UTC+10:00	Canberra, Melbourne, Sydney
3603	UTC+10:00	Guam, Port Moresby
3604	UTC+10:00	Hobart
3702	UTC+11:00	Vladivostok
3701	UTC+11:00	Solomon Is., New Caledonia
3801	UTC+12:00	Auckland, Wellington
3803	UTC+12:00	Fiji
3804	UTC+12:00	Petropavlovsk-Kamchatsky - Old
3901	UTC+13:00	Nuku'alofa

## File Open, File Save Configuration File (CSV) File Format

The G5 Upgrade Tool uses a CSV configuration file for configuration data entered in the user interface. The file is used for rapid reconfiguration of the G5 Upgrade Tool's settings, as well as a way to Save the result of each function performed using the tool.

An example of the CSV configuration file used by the tool is:

```
'#ConfigFileVersion', '1.0.0.0'
'#ConfigFileSchema', '1'
'#UserName', 'admin'
'#FWVersion', 'PDU: 3.1.1'
'#SNMPv2Com', 'public'
'#AddIP', '192.168.2.25'
'#StartIP', '192.168.2.30'
'#EndIP', '192.168.2.30'
192.0.2.2, 'upgrade', 'ready'
192.0.2.3, 'upgrade', 'ready'
```

The '#' prefixed items are common configuration items as seen in the user interface. 'AddIP' belongs to "Add Device" and "StartIP"/"EndIP" belong to "Scan Network".

If a Configuration Item is not present, or the tool will use empty values or default values (only FWVersion) in their place.

The '#ConfigFileVersion' and '#ConfigFileSchema' are necessary for future upgrades to this tool, to maintain backward compatibility.

The Device List are the entries that start with an IP Address. Duplicate entries are only operated on ONCE when the upgrade operation is applied.

The Device Lines are generally of the form:

IPAddress, 'function', 'status'

where 'function' is 'upgrade' and 'status' may be "PASS", "FAIL", or 'ready'.

## Known Issues

The software must run from a writable directory, so it can create some temporary files.

You cannot run multiple instances of this software from the same directory, because of the non-unique filenames that are created/modified by this software in the same directory.

Occasionally an ERROR may be reported in the Results text area while applying a config.csv file and the result will be a PASS. In this case, the config.csv may not have been fully applied. Please click "Start config.csv" up to two more times until it provides a PASS result and no ERROR messages are shown. Please contact Panduit customer support if the ERROR continues to occur.

## Side effects

The tool creates/overwrites these files:

- ssh-debug.log
- g5-upgrade-tool-log.txt

The tool uses the FTPS, SNMP, HTTPS and SSH protocols to perform the necessary operations. When necessary, the tool temporarily reconfigures SNMP to use 'public' and 'private' credentials.

## Verbose Information

Extra information is shown in the text console if the application is run in cmd.exe instead of being double-clicked.

## Release History

v2.0.0.0: Add "conf.ini" (bulk common configuration) and "config.csv" (per-PDU unique configuration customization) functions.

v1.0.4.0: Support x.y.z and x.y.z.w firmware version numbers.

v1.0.3.0: Eliminate sleep after mkfs. Proactive workaround (switch to non-blocking socket before ssh close) to try to avoid a socket timeout/shutdown race condition when the PDU is known to abruptly reboot.

v1.0.2.0: Updated 2.3.22 transitional upgrade firmware image.

v1.0.1.0: First release based on PG5-F1-GUT Requirements.

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