Polara

Updater Manual

350-150 Rev. A

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1. Product Description

The Polara Updater is a PC application which provides the ability to remotely (i.e. from a municipality's network) perform iCCU and iNS2 firmware updates.

1.1 Overview

Historically, firmware updates on Polara Accessible Pedestrian Signals (APS) have required a direct communication link with the device which requires the firmware update. For example, for an intersection with an iCCU connected to 8 iNS APS units, a technician must individually connect to each device (9 devices in total) and perform the firmware update independently to each device, each of which requires about 5-10 minutes to complete.

The Polara Updater allows for a "Network Firmware Upgrade" process which enables firmware updates to be transmitted from the PC on the agency's network to an iCCU in the field over its Ethernet connection to the network, and then from the iCCU to each of the connected iNS2 buttons via the existing 2-wire connections. This allows the user to update the firmware of an entire intersection (all iNS2 units and an iCCU) requiring only a single firmware transfer to the iCCU by the installer.

The feature requires the intersection to be made up entirely of iNS2 APS units (it is not compatible with legacy iNav units), connected via the 2-Wire interface to an iCCU. Additionally, the process must be initiated via an Ethernet connection to the iCCU. It is expected that the process will be controlled remotely via an Ethernet connection to the Traffic Management Center (TMC).

The Polara Updater is installed on a PC in the TMC. Each network connected iCCU unit's IP Address and Port can be added to the Polara Updater's Intersection List. The Polara Updater automatically monitors the Polara website for the latest available firmware. Either at a scheduled time or via a manually initiated process, the Polara Updater will query each iCCU and all its connected iNS units and determine which units do not have the latest firmware. For each intersection needing updates, the Polara Updater will transfer the necessary firmware to the iCCU via the Ethernet connection and initiate the firmware update process. Firmware can be transferred to multiple iCCUs simultaneously.

On each intersection receiving firmware, as soon as the iCCU receives the new firmware files, the iCCU will begin a transfer process over the 2-Wire network to each iNS unit requiring an update. In an intersection with optimal connection quality, the process should take approximately six minutes per iNS to complete. For example, for an intersection of 8 units, the total firmware update time could be under an hour. For intersections with poor connection quality between the iCCU and the iNS APS units, the transfer time may take significantly longer. While the firmware transfer is in process, the intersection will be in Maintenance Mode. This means that the iNS unit will not be operational, the pilot LED will blink in a 3-Flash pattern, and the iCCU will place constant calls to the traffic controller. Therefore, it is expected that the operator will schedule updates to occur overnight to minimize the impact on any pedestrian and vehicular traffic.

Once all iNS units have received the updated firmware files from the iCCU, if the iCCU also needs a firmware update, it will be applied first. Then each iNS unit will be restarted sequentially to apply the new update. As they are restarted, the iCCU monitors each unit to ensure the update succeeded.

As each firmware update process occurs across each iCCU and their connected iNS units, the Polara Updater monitors each iCCU unit and reports the current progress for each intersection. As they complete, the success or failure of the process is captured and saved for review. The operator can see the overall status of each intersection and see at a glance the intersections that have received the latest updates and are in good standing.

1.2 Polara Updater Features

- List of iCCU units is shared with Intelligent Config PC App. Any existing iCCU units in the list of connectable units will automatically be imported into the Polara Updater app and the lists will remain synchronized between applications.
- Global login password can be set within the Polara Updater application settings for all iCCU units, and independent passwords may be set for each iCCU if it differs from the global password.
- Firmware Update process can be set to run manually, or automatically at a specific time to run Daily, Weekly, Monthly, or Every 3 Months.
- When Firmware Update is set to run automatically, the Polara Updater remains running in the background and can be accessed via an icon in the system tray.
- The Polara Updater can be set to automatically check the Polara website for the latest firmware update, but the user can also manually select an iCCU and an iNS firmware file to be applied to all units.
- The list of iCCU units is searchable and can be filtered by keywords to limit updates to filtered units.
- Update history is stored for each intersection including information for each connected unit's serial number, firmware version, and connection quality at the start and end of the firmware update process.

2. Software Installation

2.1 Computer requirements

- Windows 7 or greater
- .NET 6.0 installed

2.2 Installation

Download the latest Polara Updater from polara.com/software

Double-click the executable to start the installation and follow the prompts.

1. Accept the license agreement
2. Accept the default destination location or specify a new folder
3. Accept the default Start Menu Folder or specify a new folder
4. Optionally, create additional shortcuts
5. Click the Install button
6. Click the Finish button to complete the installation

2.3 First-Run Steps

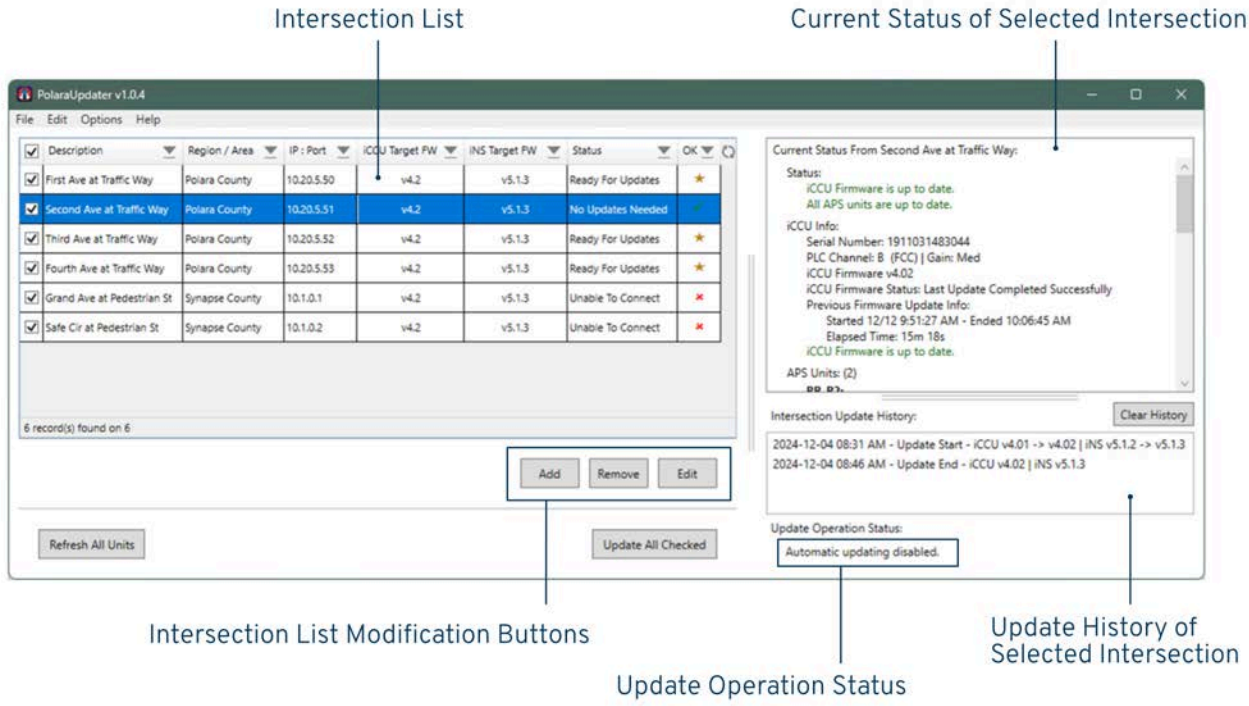
The first time the Polara Updater runs, the Software End User License Agreement must be reviewed and accepted.

It is highly recommended to change the iCCU Standard Password to the password that is typically used. Open the *Options* menu and select the *Edit Settings* item. Then edit the password. See section **4. Settings** for more information.

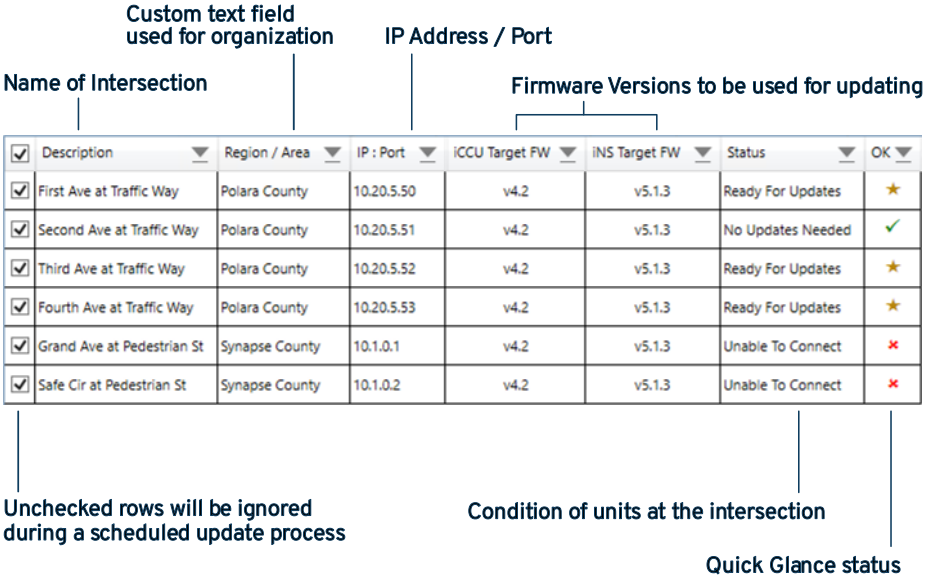
Open the **View Available Firmware** screen and verify that you have the latest version of firmware and that the Polara Updater can connect to the Polara website to obtain the latest files.

Then begin adding new intersection items to the list as detailed in the next section.

3. Intersection List



3.1 Overview



The intersection list shows the list of intersections available for access. This list is synchronized between the Intelligent Config app and the Polara Updater. List can be access concurrently by both applications such that if an iCCU is added to the list or edited within the Intelligent Config app, the new iCCU will automatically appear and be updated in the list in the Polara Updater.

3.1.1 Description of List Columns

Description

The description field is used to give a descriptive name to the intersection such as the street crossings of the intersection.

Region/Area

This field is used for an additional term that can be used to group intersections into categories for easier sorting. This can be something like a city region, district, area, county, etc.

IP : Port

The IP Address and Port used to communicate with the iCCU at the intersection. Note, the port is only shown if it differs from the factory default port.

iCCU / iNS Target FW

The iCCU Target FW and iNS Target FW columns indicate which firmware is selected for deployment in each intersection. The firmware is globally specified in the View Available Firmware dialog, available in the Options menu. In the Add/Edit dialog for an individual intersection, specific firmware can be specified for that intersection which overrides the selection in the View Available Firmware dialog.

Status

Indicates the current condition of the intersection. This status is updated during a refresh operation as well as an update operation. If any remote update is detected (where the status reads “Update Running”), the status is automatically refreshed every 30 seconds. Otherwise, the status will only be updated by manually refreshing it or by a scheduled background update.

OK

Icon indicating one of the following possible conditions:

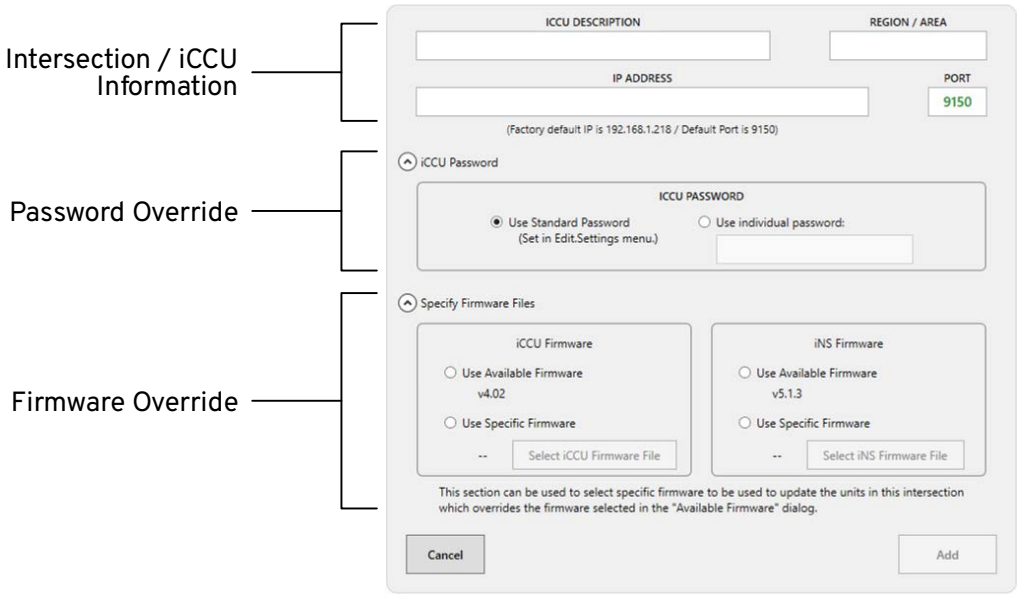
⌛ – Either a Refresh or Firmware Update operation is currently running.

✓ – All firmware is up to date and no errors are detected.

★ – A firmware update is available on one or more devices in the intersection.

✖ – An iCCU connection error occurred or an error occurred on one or more units in the intersection.

3.1.2 Adding, Editing, and Deleting



Add Dialog

- Access the Add dialog by clicking the *Add* button in the main window or selecting *Add New Item* from the *Edit* menu.
- Enter appropriate information for the iCCU Description, Region/Area, IP Address, and Port
- Password Override: If this iCCU has a different password than what is specified as the *iCCU Standard Password* in the *Settings* dialog, then that password can be overridden in this section. Select the *Use individual password* radio button and enter the password in the designated field.
- Firmware Override: This section is collapsed by default. Click the arrow next to *Specify Firmware Files* to expand the view. If you are running a test or have different firmware requirements for this intersection, the firmware files specified in the *Available Firmware* dialog can be overridden by the selection in this section.

Edit Dialog

- The Edit dialog is identical to the Add dialog. You can access the Edit dialog by selecting a single item in the intersection list and clicking the *Edit* button or the *Edit Selected Item(s)* option in the *Edit* menu, or right-clicking on the item in the list and selecting *Edit* from the context menu.
- When selecting items in the intersection list, multiple items can be selected by holding the CTRL key while clicking on intersection item rows in the list. The Region/Area, Port, Password, and Firmware sections can be edited for multiple units when more than one intersection is selected.

Deleting Intersection Items

- Select one or more items in the intersection list (multiple items can be selected by holding the CTRL key while clicking on intersection item rows in the list). Click the *Delete* button or the *Remove Selected Item(s)* in the *Edit* menu.

3.1.3 Sorting and Filtering

Column Sorting

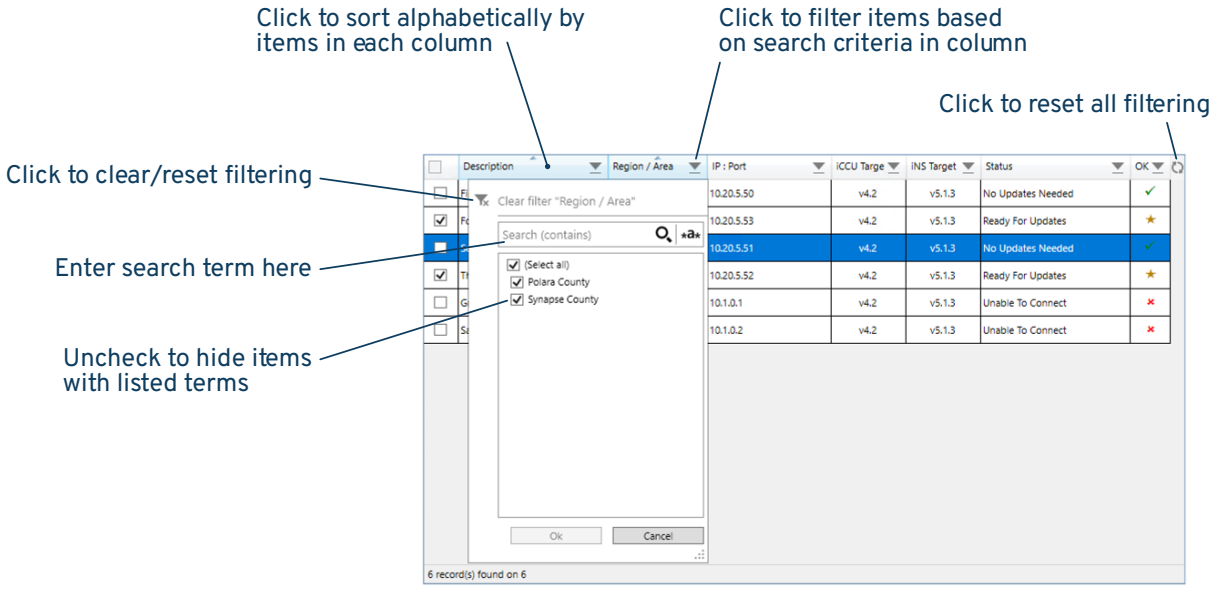
Items listed in the Intersection list can be sorted alphabetically (or numerically) by clicking on the column header. Additional clicks on a sorted column will toggle the sort method between ascending and descending. All columns can be sorted, including the left-most column with checkboxes. Click the small area outside the checkbox in the header to sort by checked or unchecked status. Hint: If the clickable area is too small, widen the column by dragging the divider between the checkbox column and the Description column to the right.

Multiple columns can be sorted. For example, if you wish to sort first by Region, then by Description, click the Region column to sort it, then hold the Shift key and click the Description column. Now items will be alphabetically sorted by Region, then within each Region, items will be sorted alphabetically by Description.

Clear all column sorting by selecting the *Clear Column Sorting* item in the *Edit* menu.

Column sorting is saved between application sessions, so if the application is closed, the next time the application is loaded, the column sorting will be retained.

If no sorting is active, items are sorted by the order in which they have been added.



Filtering

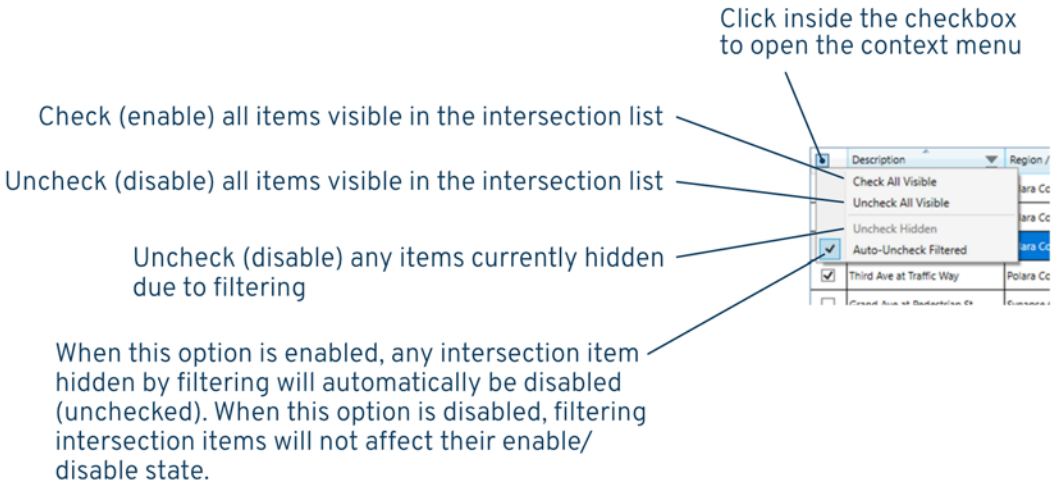
Intersection items can be hidden in the list by filtering. When a search term is used in any column, items which do not match the search term are filtered out and hidden so they are not visible in the list. When items are filtered, by default, they will automatically be disabled and will not be included in the Update All action (either manually triggered or by an automated schedule). See the Enabling / Disabling Intersection Items section to change this behavior.

On any column, click the filter icon on the right side of each column to bring up the filter menu. Click OK to activate the filter and view the results.

While filtering is active, the summary at the bottom of the list will show how many records are visible out of the total number of records. To clear all filtering, click the refresh icon in the upper right corner of the intersection list or select the *Clear All List Filters* item in the *Edit* menu.

3.1.4 Enabling / Disabling Intersection Items

The checkbox in the left-most column of the intersection list indicates whether the intersection item is enabled (checked) or disabled (unchecked). When an item is disabled, it will not be included in the group of intersections queried for updates when the *Update All Checked* button is clicked or when a scheduled automatic update occurs.



3.1.5 Importing / Exporting / Relocate Database Directory

The Intersection List is stored in a database file. If the Intelligent Config app has been installed and contains an existing list of intersections, the existing database will automatically be loaded. Otherwise, a new database will be created. If the Intelligent Config app is installed after the Updater, the Intelligent Config will then load the same database file that the Updater has created.

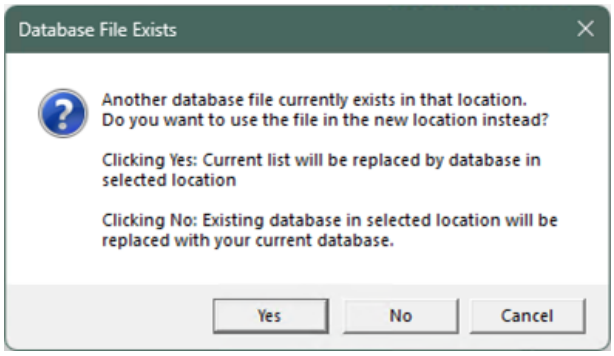
Moving Database to a Shared Location

If it is desired to share the list of intersections between multiple users / computers, then the database file can be relocated to a different location than the default location. If this is a network share, the network share must be available while the Updater app is running. If the network share is not available, a warning dialog will appear, and no operations will be available until the database directory is found or relocated.

From the *File* menu, select the *Relocate Directory* option.

Browse to the desired destination directory for the database and click *Select Folder.*

If a database file already exists in the new destination directory, a dialog box will appear giving you three options:



Yes: The currently displayed list of intersection items will be cleared and the items already existing in the database file in the selected directory will be loaded. The original file will not be deleted.

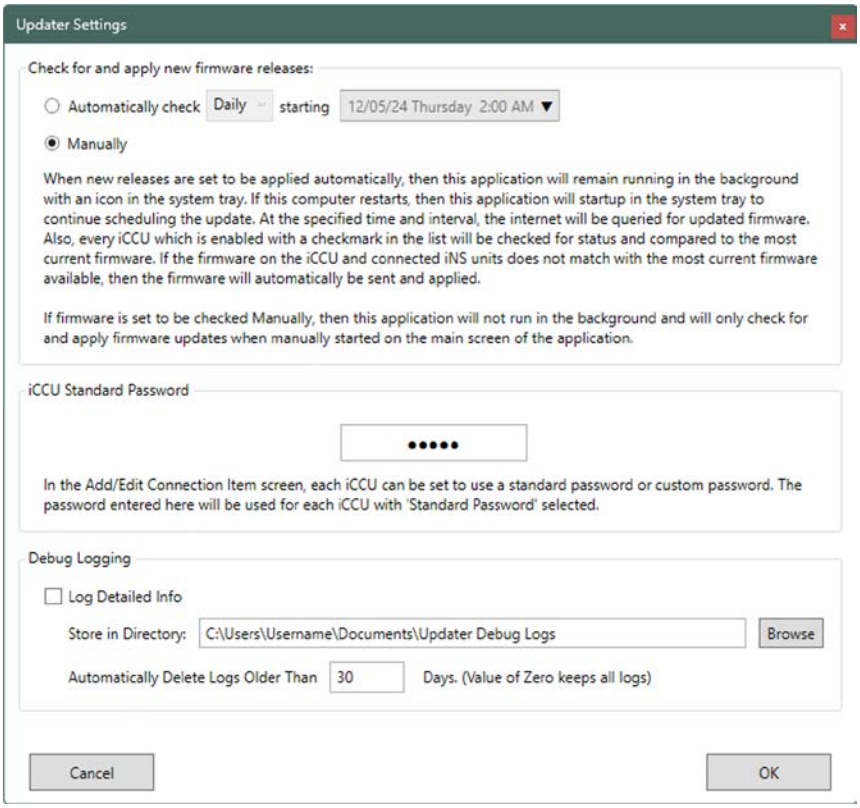
No: The file in the selected directory will be replaced and the currently open database and all intersection items currently displayed will be moved into the selected directory.
Note: The existing file in the selected directory be renamed with a backup filename in case this is done in error.

Cancel: Closes the dialog and cancels the process taking no action.

Importing / Exporting

The only way to join multiple database files together is to export the current list of items from one database, then import them into another database. To export, from the *File* menu, select *Save/Export List to File*. Then enter a filename and location for the exported file. To import, from the *File* menu, select *Load/Import List*, then select the file to import. Note: iCCU passwords and Intersection update history information are not included in exported intersection items.

4. Settings



4.1 Scheduling Automatic Updates

4.1.1 Manual Updates

By default, applying firmware updates is started manually. This can be done by clicking the *Update All Checked* button or by selecting the *Update All Checked Units* item in the *Options* menu. Additionally, specific units can be updated by first selecting their rows in the list (hold the CTRL key while selecting units to choose multiple), then right-clicking on the intersection list and selecting *Update Firmware* from the context menu. See the Performing a Firmware Upgrade section for more details on the firmware upgrade process.

4.1.2 Enable Automatic Updates

Automatic updates can be performed in the background at scheduled intervals. When automatic updates are enabled, the Polara Updater application does not exit when the window is closed but is minimized to the system tray. The application continues to run in the background in a standby mode. Then when the scheduled time occurs, the application will begin the update process which performs the same operations which occur when clicking the *Update All Checked* button (See the Performing a Firmware Upgrade section for more details on the firmware upgrade process).

To enable automatic updates, enable the *Automatically check* radio button. Then select the desired interval and choose a starting date and time.

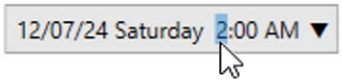
Daily – Every day at the selected starting time, the update process will begin.

Weekly – Once a week on the selected starting weekday, at the selected starting time, the update process will begin.

Monthly – Once a month on the selected starting date of every month, at the selected starting time, the update process will begin.

Every 3 Months – The update process will begin on the selected date at the selected starting time with a three-month interval between.

To select a starting date, click on the desired value to change. Then use the keyboard to type the desired value or use the arrow buttons to increase/decrease the value and move left/right through the values to change. Clicking the down arrow will provide a calendar view which can also be used to edit the specific start date.



Click on the time field to edit the specific start time.

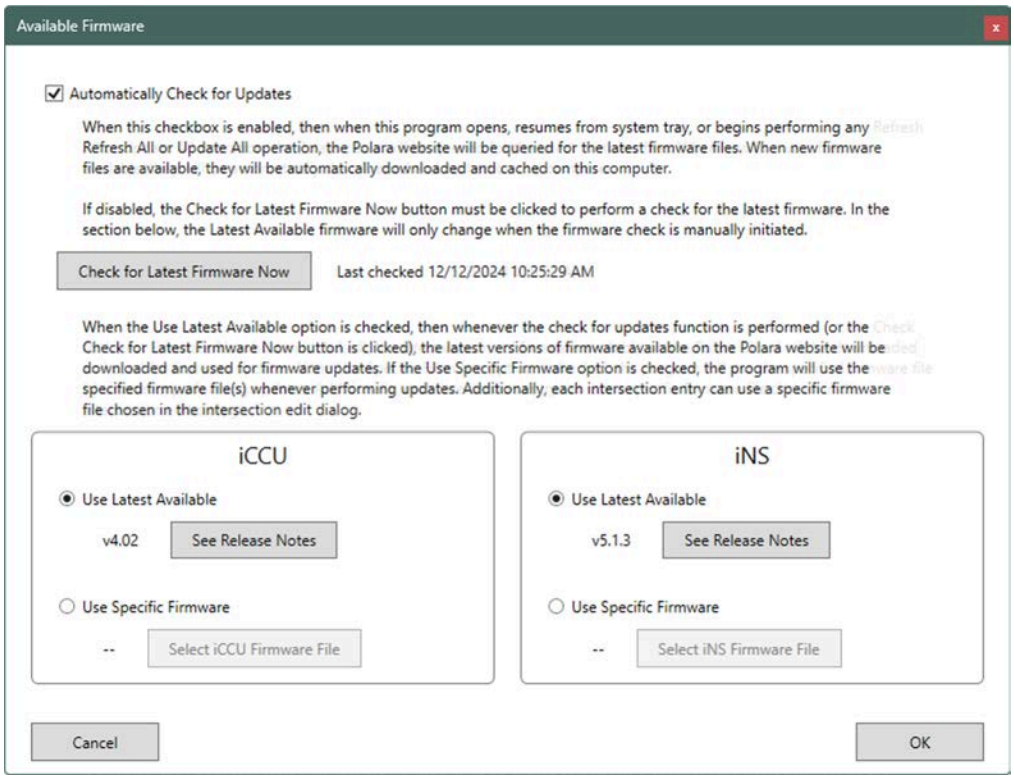
4.2 Setting Standard Password

The standard password must be set to be used when logging in to remote iCCU units. When the application is installed, this standard password is set to 12345. You must set this password to the typically used password for your group of iCCUs. When adding items to the intersection list, specific passwords can be set for each iCCU to override this standard password.

4.3 Debug Logging

To better assist Polara tech support in diagnosing any issues, logging can be enabled. This feature will log all communication to iCCU units. If directed to by Polara Tech Support, enable this feature. Then perform the firmware update operations as normal. If any issues are observed, the logs can be packaged and transmitted to Polara for evaluation. To package the debug files, select the *Export Debug Data* option in the *File* menu.

5. View Available Firmware



5.1 Overview

The Polara Updater can check the Polara website for the latest available firmware files. By default, the *Automatically Check for Updates* is enabled so that each time the application opens or any Refresh All or Update operation occurs, the website is queried to make sure the latest firmware files are downloaded for the application to use. You can also click the *Check for Latest Firmware Now* button to perform the check immediately.

If the *Use Latest Available* radio buttons are enabled, then the latest firmware will be used to compare with the installed versions on the units in intersections.

5.2 Specific Firmware Files

If it is desired to only use specific firmware files to perform updates in the intersections, then you can select the specific iCCU and iNS files to use for updates. Click the *Use Specific Firmware* radio button on the desired unit type, then click the *Select iCCU/iNS Firmware File* button to open a file selection dialog box. Select your desired firmware file. The file will be verified to make sure the file is valid, and the version of the firmware file will be displayed.

Specific firmware files can also be selected for specific intersections which will override the settings selected in this dialog. These can be specified in the Intersection List Edit dialog (see section **4.1.2 Adding, Editing, and Deleting** for more details).

6. Performing a Firmware Upgrade

6.1 Before Starting a Firmware Upgrade

6.1.1 Polara System Requirements

- Compatible Units: iCCU-S2, iCCU-C2, iNS2, iDS2
- Each iNS2 requires firmware v5.1.3 or greater to be installed in each unit in the intersection before the Network Firmware Update feature can be utilized. If units in the field do not have this version of firmware, they must be manually upgraded at the intersection before network firmware updates are possible.
- iCCU requires firmware v4.02 to be installed before the Network Firmware Update feature can be utilized. This firmware can be installed remotely using the Intelligent Config PC App.
- iCCU requires an Ethernet connection to the TMC for scheduled remote updates.

6.1.2 Recommendations

On each intersection receiving firmware, as soon as the iCCU receives the new firmware files, the iCCU will begin a transfer process over the 2-Wire network to each iNS unit requiring an update. In an intersection with optimal connection quality, the process should take approximately six minutes per iNS to complete. For example, for an intersection of 8 units, the total firmware update time could be under an hour. For intersections with poor connection quality between the iCCU and the iNS APS units, the transfer time may take significantly longer. While the firmware transfer is in process, the intersection will be in Maintenance Mode. This means that the iNS unit will not be operational, the pilot LED will blink in a 3-Flash pattern, and the iCCU will place constant calls to the traffic controller. Therefore, it is expected that the operator will schedule updates to occur overnight to minimize the impact on any pedestrian and vehicular traffic.

6.2 Refresh Unit Information

When the Polara Updater application is first opened, the Updater is not aware of the status of units at remote intersections. That is, no communication over the network has occurred, yet. The intersection list will display a Status value of *Status unknown. Refresh needed.* To update the status of a single intersection, double-click on the intersection item and the Polara Updater will remotely connect to the iCCU via Ethernet, login, and query the iCCU and all connected iNS2 APS units for their information, then disconnect. To update a select few units, hold the CTRL key while clicking on multiple intersection item rows to select them, then right-click and select *Query/Refresh status* from the context menu. To refresh all units in the intersection list (all units will be queried regardless of the checkbox in the left column), click the *Refresh All Units* button. When multiple units are selected, communication with up to five units will be performed simultaneously to speed up the process. All will follow the same connect, login, query, disconnect process.

The Status column will display the detected status of the intersection. During the status check, the firmware installed on each unit in the intersection is compared to the selected firmware for update. If the firmware does not match, and all units are capable of a Network Firmware Update, then the status will display as *Ready for Updates.* If any units do not support Network Firmware Update, the status will display as *On Location Update Required.* If all units are up to date, the status will show *No Updates Needed.* See the complete **Status Messages** list in the **Reference** section for more details on status messages.

The Current Status window is the information box to the right of the Intersection List and it contains the detailed status information from the latest refresh. The selected and highlighted intersection information will be displayed. This status includes three sections, the Status section which shows the state of the iCCU and iNS units and how many units are ready for updates. The iCCU Info section displays detailed information about the iCCU including its serial number, 2-wire

communication setting, installed firmware, and information about the last firmware update. The APS Units section details information about each unit including the 2-wire communication connection type, unit type, serial number, phase setting, firmware version, and information about the last firmware update.

6.3 Initiate and Monitor a Firmware Update

A firmware update process can be initiated manually or via a scheduled task. See the Scheduling Automatic Updates section for details about enabling automatic updates. Manual updates can be done by clicking the *Update All Checked* button or by selecting the *Update All Checked Units* item in the *Options* menu. Additionally, specific units can be updated by selecting (hold the CTRL key while selecting intersection item rows to choose multiple), then right-clicking on the intersection list and selecting *Update Firmware* from the context menu.

When a firmware update process runs, the following is performed for each intersection included in the update:

1. Online check for the latest firmware is performed (if enabled).
2. Updater establishes connection to iCCU.
3. iCCU and all connected iNS2 units are queried for current status and firmware version.
4. If firmware update is available and condition of intersection is ready for update, the selected firmware files are transferred to the iCCU and the iCCU begins the Network Firmware Update.
5. Updater disconnects from the iCCU.
6. The Intersection Update History is updated to include the start event, and the Current Status information is stored with it.
7. The iCCU puts the intersection in maintenance mode, then begins transferring the firmware files to each connected iNS2 in the intersection.
8. Once all firmware files have been transmitted to each iNS2, the iCCU sends the command to apply the new firmware files to all iNS2 units, then applies the new firmware files to itself.
9. The iCCU reboots and begins to verify the firmware updates completed on each iNS2.
10. When all iNS2 units have successfully completed firmware updates, the process is complete.
11. While the iCCU is busy performing the remote update, every 30 seconds the Updater queries the iCCU for updated progress information.
12. When the Updater detects that the firmware update has completed, the Intersection Update History is updated to include the completion event, and the new Current Status information is stored.

NOTE: While the firmware transfer is in process, the intersection will be placed in maintenance mode. This means that the iNS units will not be operational, the pilot LEDs will blink in a 3-Flash pattern, and the iCCU will place constant calls to the traffic controller. This action ensures that pedestrians will get a Walk signal.

6.4 Intersection Update History

The Intersection Update History is unique for each intersection item. As you click on the individual intersection item rows in the list, the Intersection Update History will show each firmware update event which the Updater has captured. For each intersection, the Update History is modified when the firmware update process begins and when it completes. As you click on the individual events in the Update History window the Current Status window updates to show what the status was at that time.

The Intersection Update History will only be captured while the Polara Updater application is running. If the firmware update process is manually initiated and then the Updater application is closed while the iCCU performs the remote update. Then the history will only capture the starting event, and there will be no history for the completion of the firmware update. To make sure all the history is captured, leave the Polara Updater application running for the entire duration of the firmware update process.

7. Status Messages

- **No Updates Needed**

  All units in the intersection match the target firmware versions specified for update. No additional firmware updates are needed.

- **Ready for Updates**

  One or more units on the intersection has firmware that does not match the target firmware version specified for update and is ready to begin the update process.

- **Connecting**

  The Updater is currently attempting to connect and login to an iCCU.

- **Update Running**

  This is displayed while the iCCU is busy sending firmware through the 2-wire communications network to the connected iNS units or while the iNS units are completing the firmware update process by applying and restarting. An estimated percentage is displayed next to the status indicating how many iNS units have completed the update.

- **Cancelled By User**

  The *Cancel Current Operation* button was clicked while an operation was in process.

- **Unable To Connect**

  The iCCU cannot be reached via the Ethernet connection via the given IP Address and Port.

- **Incorrect Password**

  The password specified in either the iCCU Standard Password section of the Settings dialog or in the iCCU Password section of the intersection item edit dialog does not match the password in the remote iCCU unit.

- **Firmware Update Preparation Error**

  While attempting to start a firmware update process, one or more communication issues occurred with the iCCU. See the detailed status information by selecting the intersection item in the list and viewing the information in the Current Status box.

- **Device Comm Error**

  An unexpected response was returned from the iCCU while attempting to login. This could indicate the iCCU is in an error state and requires on-site diagnosis if the problem persists.

- **On Location Update Required**

  One or more units at the intersection does not support the Network Firmware Update feature. This could be due to the iCCU having firmware below v4.02 or an iNS unit having firmware below v5.1.3 or a legacy iNavigator being present in the intersection. In order for the Network Firmware Update feature to operate, all units in the intersection must support the feature.

- **APS Disconnected**

  It is detected that one or more APS units are in a disconnected state from the iCCU. This could be due to 2-wire communication settings, or an iCCU setup error.

- **APS Error**

  A communication occurred while attempting to communicate with an iNS through the iCCU. This could occur due to poor quality communication on the 2-wire network, or if the iNS is restarting after a firmware update.

8. Technical Support Contact

Contact Polara @ 903-366-0300 EXT 4 or 888-340-4872 EXT 4

Polara Enterprises, LLC
1497 CR 2178
Greenville, TX 75402

The latest version of this manual is available in PDF format at support.polara.com.