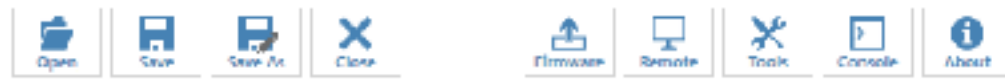


Usability and Feature Changes in PowerVision 2.9

The following is an overview of the UI changes coming in the PowerVision 2.9 release. PowerVision 2.9 is a major release which brings several bug fixes, usability improvements and some new features.

Major Changes in 2.9

- **Simplified Toolbar and Tools Dropdown-** The PowerVision main toolbar has been redesigned.

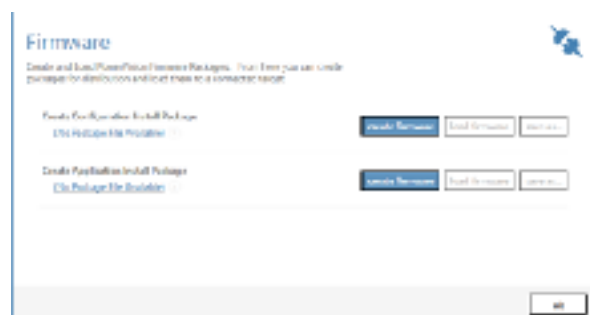


- **Open** - Open a PowerVision Project or Configuration as well as create new projects using built in templates with this dialog. This combines the “New” and “Open” buttons.
- **Firmware** - Access the Firmware Generation Dialog to create and load firmware. This replaces the “Create” and “Load” buttons. Also, note that this button will be highlighted if there is a connected display allowing you to see the connection state from any screen.
- **Remote** - All debugging features are now accessed using the “Remote” button. This replaces the previous tool called “Remote Diagnostics” with an enhanced debug toolset.
- **Device Connected** - When a device is connected the Firmware button will highlight indicating that it is available to load firmware.

- **Open Dialog** - This new dialog is used to create configurations from templates as well as to open existing configurations. The dialog shows recently opened configurations (**Recent tab**), configurations in your DB folder (**Local Tab**) and built in PowerVision templates (**Templates Tab**.) In addition, the open dialog can open configurations from anywhere on your file system using the “Browse Other Locations” button located on the bottom left side of the dialog.



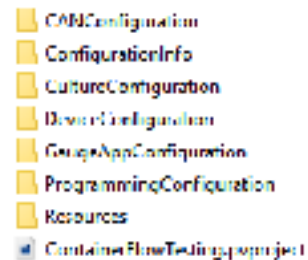
- **Firmware Generation Dialog** - This new dialog replaces all previous create and load features. This dialog simplifies generating all firmware types (Configuration & Full



Installs) and allows you to save previously created files to your disk or thumb drive without having to create again. It provides a single location for all creation and loading operations.

- **Open from Anywhere** - You can now store your code anywhere. The previous method of “Importing” *.murphyConfig files to the DB’s folder no longer is used. Instead, these files (and the new *.pvproject files) will now open in place where they are stored. This allows you to organize your files in your own directory structures rather than keeping them in the DB folder. The ../Murphy Configurations/2.9/DBs folder is maintained for backward compatibility.
- **PowerVision Projects (.pvproject File Format)** - Many PowerVision users keep their source code (.murphyConfig files) in source control systems such as SVN, GIT, etc. Unfortunately, the current file format uses a single compressed file that can’t be easily differenced by these systems. Our roadmap includes supporting full source control systems in the future and allowing multi-user support. The first step toward this goal is to support a file format which uses XML Files for all programming code, such as variables and scripts, and Binary Files for all resources, such as images and fonts.

This new file format is the PowerVision Project or *.pvproject file. When saving PowerVision code to this format, a single file is stored at the root of a folder and all code and binary data is stored in sub folders. This allows a source control system to see the differences between each time PowerVision executes a save. When using a source control system such as GIT or SVN, this new project format allows a user to see the differences between saves, decreases storage since binary files don’t get duplicated and allows the user to easily roll back to previous versions.



* Please note that we do NOT yet support multiple users accessing the configuration at the same time via source control.

* Also note that the *.murphyConfig and *.pvproject can both be used with PowerVision 2.9 as it will open and save both formats.

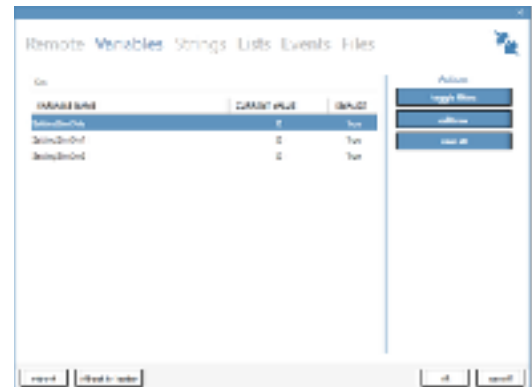
- **New Hardware Platform (M2)** - PowerVision now supports products based on a new hardware platform with a higher speed and more modern M2 processor. These hardware types (including the new PV780B) will show in the OEM M2 hardware group. Hardware based on this platform can handle much larger configurations with more complex user interfaces while providing more fluid animations and eliminates many

bottlenecks related to programming.

- **New TCP Communication Conduit (TCP Conduit)** - The current system used to connect color displays to PowerVision has been re-written to offer many enhanced features (such as the Remote Dialog). The new conduit (selected on the Configuration tab of PowerVision) uses a standard Google Protocol Buffer API to connect to displays. This new API for connecting displays offers a single unified communication method that will be used for all display communication moving forward. Documentation for this protocol is not yet available but is planned in a future release.

* Please note that the old Web Conduit is still available and required for the “Debug Console”. In addition, this conduit can be used if you encounter errors using the new TCP Conduit.

- **Remote Dialog for Debugging** - This new dialog (available by clicking the “Remote” button on the main toolbar, allows the user to access several new tools for debugging and viewing live data on the connected display. The dialog will present different tabs based on the connected hardware but generally has support for the following features.



- **Remote:** View the Current Screen. User can also trigger key presses and touch events.
 - **Variables:** View and Edit Variables.
 - **Strings:** View and Edit Reserved Strings.
 - **Lists:** View and Edit List Data.
 - **Events:** Trigger an event on the display.
 - **Files:** Download Files from Script Directories.
 - **Reboot & Reboot to Loader** - Initiate a reboot on the display.
- **Include in API** - PowerVision now includes the ability to expose various items to its Public API (TCP Conduit). This is accomplished by selecting the “Include in API’s” checkboxes on variables, events, strings etc. Once included, these items can be edited via the “PowerVision Toolkit.”
 - **Flow Container Alignment** - You can now use a container to “Flow” items. This is useful when you have multiple text widgets or a combination of text widgets and images. When enabled widgets in the flow container will wrap similar to how a text

widget wraps text content.

- **PowerVision Toolkit** - PowerVision now has support for a MUCH-improved PowerVision Toolkit. This small software package is used by technicians and non-PowerVision users to do basic tasks when connected to a display. This software allows users without PowerVision to do the following tasks.
 - **Load Firmware** - Load firmware on any PowerVision device using the Web, TCP or CAN conduit.

In addition, when using the TCP Conduit on PowerVision 2.9 devices the user can do the following.

- **Reboot and Reboot to Loader:** Trigger a reboot on the display remotely.
- **Remote:** View the Current Screen. User can also trigger key presses and touch events.
- **Variables:** View and Edit Variables marked Include in API.
- **Strings:** View and Edit Reserved Strings marked Include in API.
- **Lists:** View and Edit List Data marked Include in API.
- **Events:** Trigger an event on the display marked Include in API.
- **Files:** Download Files from Script Directories such as configuration generated log files.



* This software is available as a standalone installer and does not require PowerVision or a license key.

- **New DotNet Framework Required** - PowerVision requires the DotNet framework 4.6.1. This change brings better compatibility with Windows 10 as well as security fixes. This framework still supports operating systems as old as Windows 7.

* Note that PowerVision 2.9 does not work on Windows XP.

- **Animated Start Logos (M2 Only)** - You can configure a set of images to show on startup allowing you to create simple startup videos.

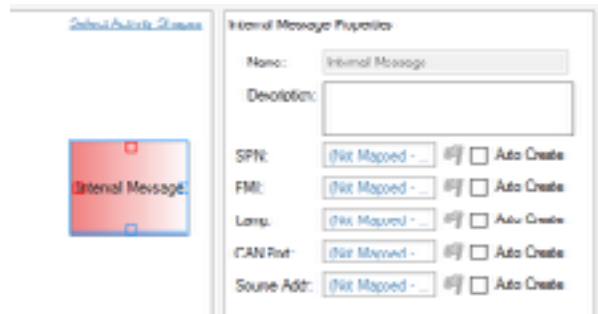
Upgrade Considerations

The following items should be considered when upgrading to 2.9. Most are small changes that can affect old configurations and will need to be corrected during the upgrade process.

- For Customers using existing hardware and upgrading to PowerVision 2.9:
 - There are no major upgrade considerations or relevant new features on existing hardware.
 - M2 Focus - Most work was completed to support new hardware features in this release and no changes were made to existing firmware with the exception of work done for compatibility with 2.9. You should consider leaving configurations for current hardware (PV780, PV350, etc) on PowerVision 2.8.
- For customers converting from old hardware to new M2 based hardware:
 - Screen Application does not require “ScreenProcess” action. This will be deleted automatically when converting from a PV780 to PV780B as it’s no longer needed.
 - Screen Application does not require global video actions. These should be deleted by the user when converting from PV780 to PV780B as they are no longer needed.
 - Performance of Scripting and Other programming tools is no longer a bottleneck. Unlike existing hardware which performs best when using state machines and minimal scripting, this platform has enough headroom to allow you to select the programming system you prefer for simplifying your configuration.

Minor Changes in 2.9

- **Overall UI Changes** - PowerVision is migrating to a new UI library which is better supported on modern Windows releases such as Windows 10. This library also introduced a new look and feel seen in most dialogs and will continue to the main UI in future releases and patches.
- **Memory Improvements** - PowerVision M2 based hardware produces much larger firmware files. Because of this many memory problems were corrected as limitations were uncovered during development. For example, firmware is now generated in temp files minimizing ram usage.



- **New DM Internal Message Shape for Activities** - There is a new shape available on color display to easily create an “Internal DM Message” without the need of scripting.
- **Reboot to Loader Firmware Action (M2)** - This single purpose action allows a PowerVision programmer to initiate firmware installs on a display from the configuration program by passing a configuration file name. This prevents the user from needing to use the bootloader/ firmware install tools directly.
- **Wormhole Widget (M2)** - This single purpose widget allows you to take a container and show it in two places in the configuration. This prevents you from copying complex containers between screens to simplify complex container maintenance. There are some limitations to using this widget but it is handy for many configurations. Consider using it when you have multiple screens with the same UI or want to show two instance of the same component on a single screen.
- **Support for Logging on CAN Port 2** - The J1939 Port Manager application now has separate logging events for Port 2 and Percent Output variables when exporting CAN Logs.
- **Improved Units Validation** - We have improved the validations when Units are deleted or renamed to prevent crashes during startup.
- **Find References in Activities** - Supports finding references on Activity programs directly without finding the associated event.

- **Find References in Images** - Supports finding places where an image is used in the configuration.
- **Support for Copy/Paste on J1939 Groups** - Copy and Paste on a J1939 Parameter group will now copy the PGN and SPN's allowing you to move PGN's more easily without the Import / Export tools.
- **Improved Parameter Setup** - Added an option to "Add to Device" a J1939 Parameter from the J1939/NMEA Parameters tab in the Library.
- **Filtering on Free Form Messages** - For configurations with many free form messages, you can now filter by name to find the message in the list.
- **Free Form Message Copy and Paste** - You can now copy and paste Free Form Messages from one configuration to another directly without using the Import/Export tools.
- **Edit Variable Units** - You can now edit the unit on ANY variable including system created variables.
- **JPEG Support (M2)** - You can specify JPEG images to shrink configurations and speed screen load time for images that are full screen.
- **Analog Video Improvements (M2)** - Video Widgets can be placed on upper layers with widgets showing above them. This allows you to create simple video overlays for scenarios that require it (backup cameras for example). In addition, video can be stretched, mirrored or flipped.
- **Digital Video (M2) Experimental** - Support for playback of Video files in H.264 format using the "Digital Video Widget".