[PRO CONTROL STUDIO REFERENCE GUIDE V1.0]

Table of Contents:

Introduction **5**

Glossary of Terms **6**

Getting Started **7**

Powering 7

Charging 8

Locating the Charging/Programming Port 9

Processor Icons/LED's 10

Button Layout 11

Firmware 11

Warranty and Repair/Return Process **12**

Technical Support Contact and Process **13**

Step-by-Step Programming Overview **13**

Install and Open Pro Control Studio **14**

Creating/Opening a System File **14**

Adding Pro Control Devices **15**

Handheld Controllers 17

Processors 18

PRO CONTROL

Adding Controlled Devices **19**

IR Controlled Devices 19

Serial (RS-232) Controlled Devices 19

Driver Controlled Devices 19

Pages **22**

Template Pages 24

Creating Pages 25

Importing Pages 29

Editing Pages 31

Deleting Pages 31

Auto-Programming 32

Adding Driver Feedback 34

Using Button Text Variables 34

Using Button State Variables 37

Reversed 37

Inactive 37

Visible 37

Macro Programming **40**

Macro Step Definitions 41

Macro Examples 43

Adding Commands to Buttons 43

Activity Macros 45

Using Power Sensing 50
Using Flags 52
Testing Two-Way Variables 61
IF/RF Macros 62
Processor Events 64

Downloading to Devices 67

USB 68
Ethernet 68

Appendix A 69

Installing Pro Control Studio 69

Appendix B 73

Learning IR Commands 73
IR Learning Troubleshooting 82

Appendix C 83

Adding Custom Color Graphics 83

Appendix D 85

General Troubleshooting 85
IR Troubleshooting **87**

Pro Control Studio

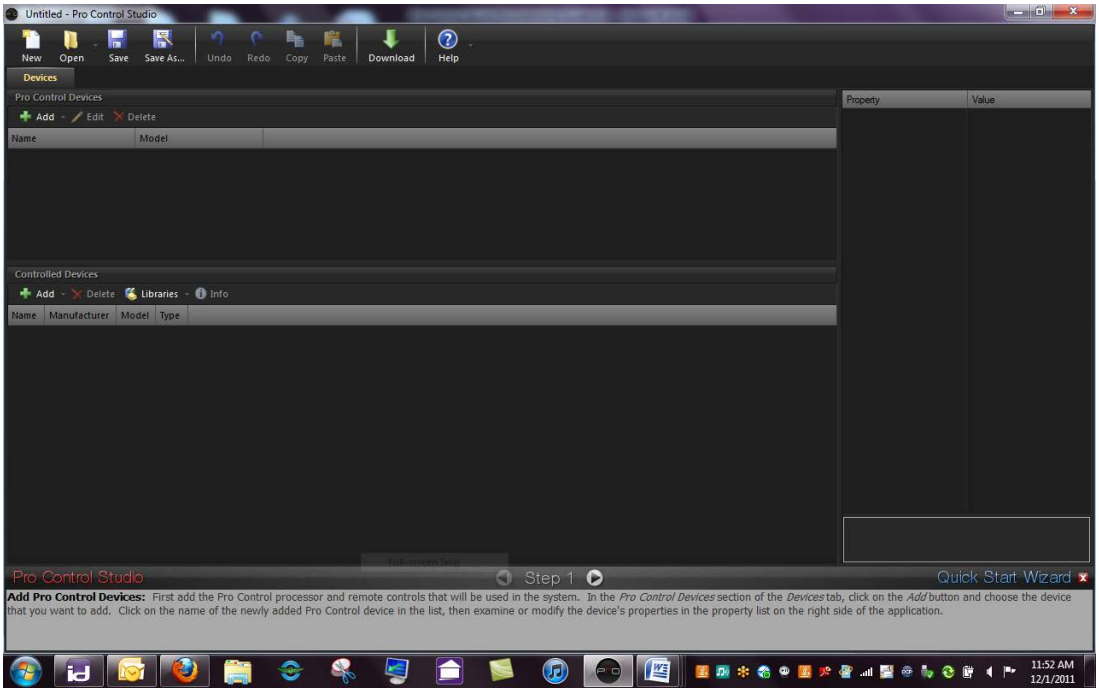
Introduction:

Pro Control Studio is a powerful, easy-to-use, Windows based software package that allows an entire Pro Control system to be programmed from a PC. It includes a wide variety of powerful tools that make the programming process quick and easy.

Pro Control Studio provides complete flexibility in the design of the graphic user interface (GUI). Several pre-defined buttons, symbols and page templates are included in the software.

In addition, the software includes robust infrared, RS-232, and Driver libraries. Commands are stored and can be reused in multiple systems and are added to any Macro by a simple mouse-clicking process. An auto-programming feature allows simple and fast system configuration.

Pro Control Studio provides a simple interface enabling every button in the system to carry out complex multi-step actions.



PRO CONTROL

Glossary of Terms:

Pro Control Devices:	Pro Control handheld controllers and/or control processors.
Controlled Devices:	Third-party equipment such as A/V receivers, cable boxes, and DVD players.
Properties:	Configuration settings applying to Pro Control Devices, Buttons, or Macros.
Value:	Adjusted properties applying to Devices, Buttons, or Macros.
Commands:	Infrared, RS-232, or TCP/IP instructions to a third-party device.
Driver:	Software files allowing 2-way control and feedback of a Controlled Device (e.g. A/V Receiver), or a Widget/Non-Device (e.g. Weather Driver, Clock Driver).
Macro:	Single command or series of commands containing Commands, Page Links, Time Delays, etc. used to control and automate the system.
Download:	Sends Pro Control Studio System File to Pro Control Devices.
Pages:	Touch panel Buttons, Graphics, and Hard Buttons associated as a User Interface.
Screens:	Additional “frames” of touch panel graphics and buttons associated to a Page.
Buttons:	Buttons are the functional elements of a Pro Control system. Remote control devices include physical “hard” buttons that are programmed with frequently used commands. Touch panels allow for buttons that are drawn and programmed using the Pro Control Studio software tools. All buttons can be associated with Commands, Macros, and Page Links.
Templates:	Pre-defined sets of pages with a common appearance and functionality.
System File:	All programming for Pro Control Devices associated to a specific system.
Soft Key(s):	Hard buttons with variable use, based on touch screen graphics.

Getting Started:

Powering the Pro Control Devices

Handheld Controllers

The power switch for the handheld controllers (remotes) is located on the back of the device, inside the battery compartment. Once the system is programmed for daily use, this switch should remain in the ON position. If the system will not be used for an extended period of time, the user may turn the device OFF. Prior to long term storage, please ensure the battery is fully charged.

To access the power switch, locate the battery cover on the back of the device.

To remove the cover, press the top of the cover and slide off the cover. The power switch is located directly above the battery compartment.

Processors

Pro Control processors do not have a power switch. They are powered and ready for use when plugged into the provided power supply.

Charging the Handheld Controller

To charge the battery on the Pro24.r, locate the Charging/Programming port on the bottom of the handheld controller. The Pro24.z may be charged via the port, or the provided charging dock.

Plug the provided charging cable into a nearby wall socket, and insert the USB connector into the Charging/Programming port.

The red charging LED on the front of the controller will flash while the device is charging. When charging is completed, the LED will illuminate steadily. Once fully charged, the device is ready for use. The device may continue to be used while the device is charging.

Locating the Programming Port

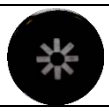
Handheld Controllers:

To load the System File into the handheld controller, locate the Charging/Programming port on the bottom of the device. Connect the provided programming cable into this port (**USB B**) while the controller is ON. Plug the other end of the cable (**USB A**) into the computer used to program the device with Pro Control Studio.

Processors

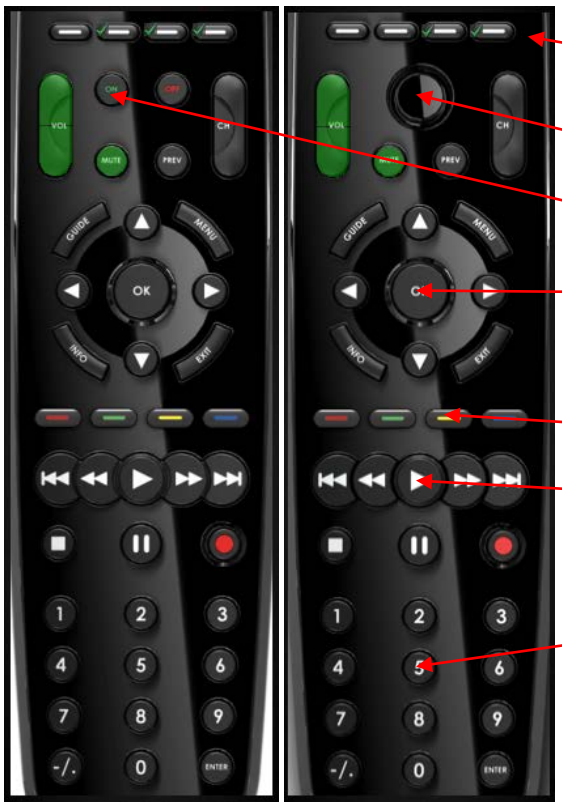
To load the System File into the processor, locate the Programming port on the left side of the device (labeled “USB”). Connect the provided programming cable into this port (**USB B**). Connect the other end of the cable (**USB A**) into the computer used to program the device with Pro Control Studio.

Processor LED Icons

	POWER	STATUS	NET LINK	RF LINK	RF DATA	IR IN	IR OUT	SENSE
								
LED	On when unit is powered up	Solid when not programmed and briefly upon first power up. Will flash with any activity sent or received from the unit	Solid when network detected, flashing when seeing network traffic	Solid when RF connection is setup and ready for data	Flashing when transmitting or receiving RF data	Flashes when IR is received in the processor	Flashes when IR is sent from the processor	Flashes when data is sent or received through a sense port

Button Layout

Pro24.r **Pro24.z**



"Soft Keys" to correlate with graphics on the touch screen

5-way joystick (Pro24.z only)

Power buttons (Pro24.r only)

Cursor keys

Color buttons

Transport keys

Numeric keypad

Firmware Version and Updating

Current firmware version is viewable in the "Download" window. Click the "Download" button while the Pro Control Device is plugged in via the USB programming cable. Select the device from the list to view. If a more current firmware version is available, download it from the Pro Control website. Click "Update Firmware", and follow on-screen instructions.

Limited Warranty

Pro Control warrants its products for a period of one (1) year (90 days only for included battery packs); or for a period of time compliant with local laws when applicable from the date of purchase from Pro Control or an authorized Pro Control distributor.

This warranty may be enforced by the original purchaser and subsequent owners during the warranty period, so long as the original dated sales receipt or other proof of warranty coverage is presented when warranty service is required.

Except as specified below, this warranty covers all defects in material and workmanship in this product. The following are not covered by the warranty:

Damage resulting from:

1. Accident, misuse, abuse, or neglect.

2. Any product purchased via unauthorized channel or internet website.

3. Failure to follow instructions contained in this Guide.

4. Repair or attempted repair by anyone other than Pro Control.

5. Failure to perform recommended periodic maintenance.

6. Causes other than product defects, including lack of skill, competence or experience of user.

7. Shipment of this product (claims must be made to the carrier).

8. Being altered or which the serial number has been defaced, modified or removed.

Repair/Return Process

Pro Control customer service is available for authorized dealers requiring assistance with product warranty questions and repair issues.

Pro Control customer service may be contacted by both email and phone:

service@procontrol.com

1-952-224-5020

Customer service hours, excluding holidays: 8:00am to 5:00pm Monday – Friday CST

Technical Support

Pro Control technical support is available for authorized dealers requiring assistance with products and programming issues.

Pro Control technical support may be contacted by both email and phone:

support@procontrol.com

1-952-224-5024

Technical support hours, excluding holidays: 8:00am to 5:00pm Monday – Friday CST

Programming Overview

Step-by-Step

1. Install and open **Pro Control Studio** programming software.
2. Add **Pro Control Devices** to the **System File**. Adjust **Properties** as necessary.
3. Add **Controlled Devices**. Adjust **Properties** as necessary.
4. Add **Pages** via **Templates** or build custom pages.
5. Confirm **Auto-Programming** and adjust as necessary.
6. Create **Macros** to simplify and automate the operation of the system.
7. **Download** System File to Pro Control Devices.

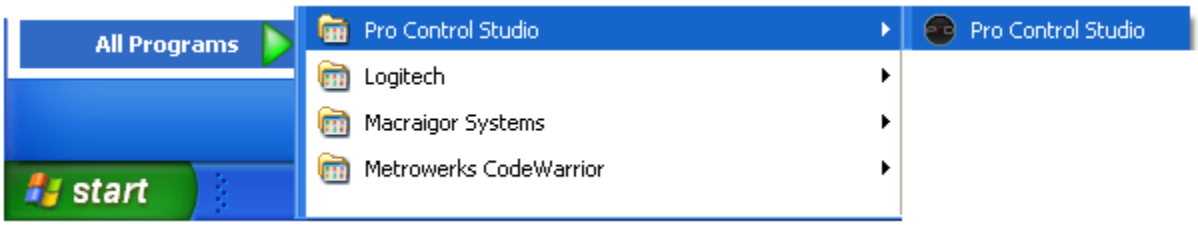
Install and Open Pro Control Studio

Install Pro Control Studio

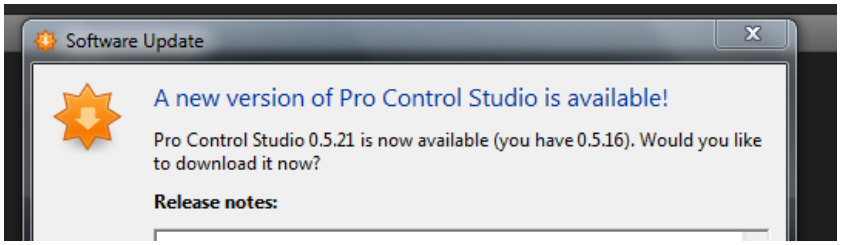
See **Appendix A** for installation instructions and information.

Open Pro Control Studio

Once installed, Pro Control Studio may be accessed through the "**Start**" menu. A Desktop shortcut may be created as well.



Verify that Pro Control Studio is running the current version by clicking the "**Help**" button on the toolbar at the top of Pro Control Studio. Select "**Check for Updates**". When opening Pro Control Studio, a pop-up window may inform you of a new version available.



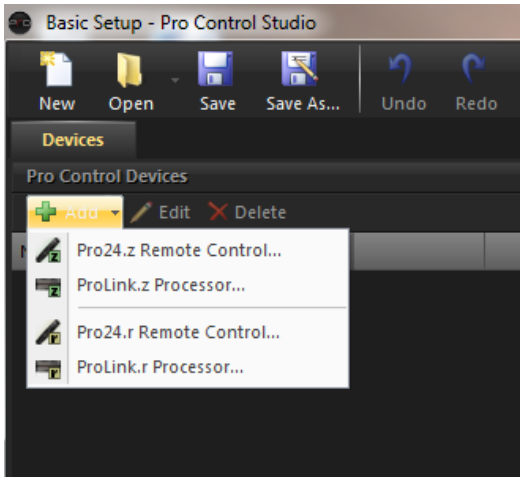
Help/Quick Start Assistant

The Pro Control Quick Start Assistant provides a basic, step-by-step overview to quickly program a basic system. It may be accessed via the "**Help**" button.

Add Pro Control Devices to the System File

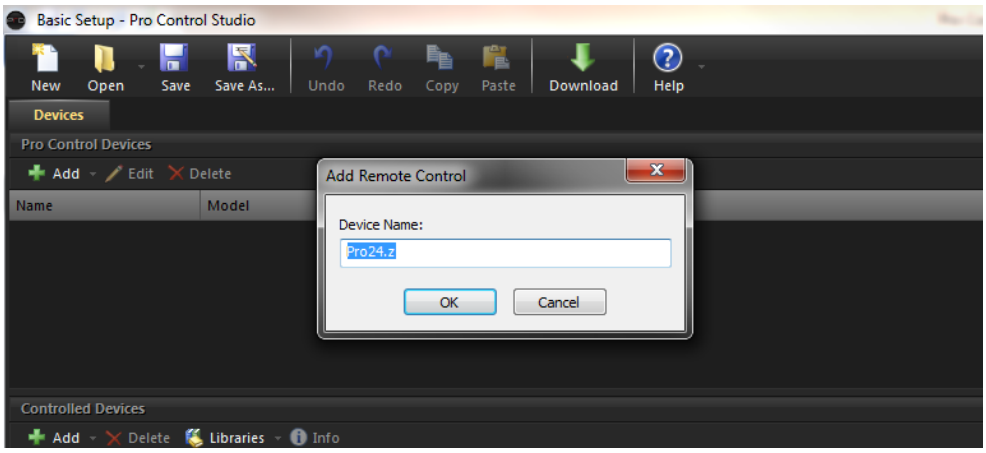
Add the required **Pro Control Devices** to Pro Control Studio. Click the "**Add**" button in the upper left corner under the "**Pro Control Devices**".

A list of Pro Control Devices will be exposed. Select Pro Control remote controllers as necessary. Only one processor may be added to a **System File**. A System File may contain only compatible devices (i.e. Pro24.z remotes with ProLink.z processor). Incompatible devices will not be selectable from the list.

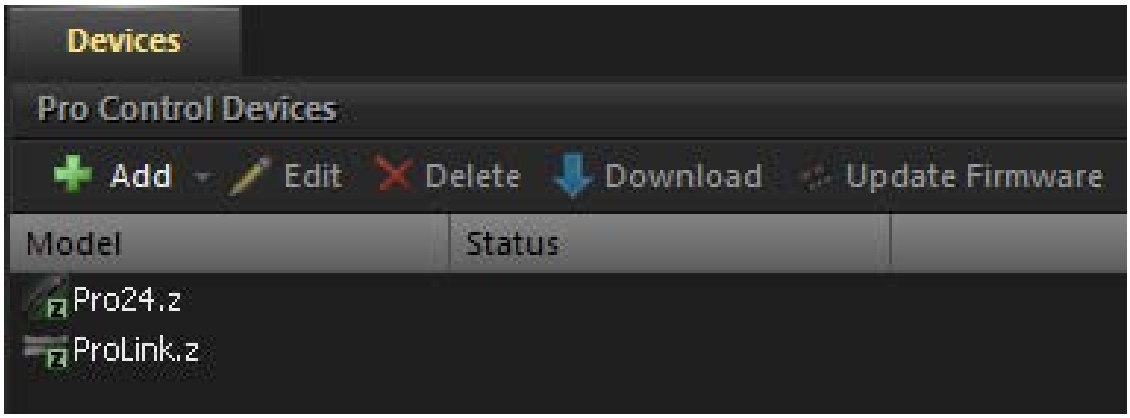


PRO CONTROL

After selecting the Pro Control device, it may be named (e.g. “Living Room Remote”). Add all Pro Control devices used in the system in this manner.



The selected Pro Control Devices will appear in a list in the “**Pro Control Devices**” section.



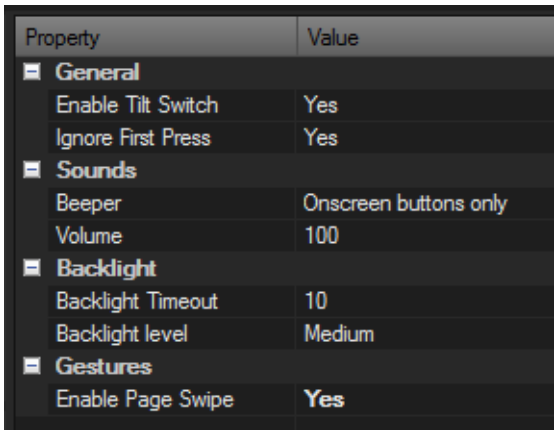
The Pro Control devices may be renamed at any time by right-clicking the existing name and selecting “**Rename**”.

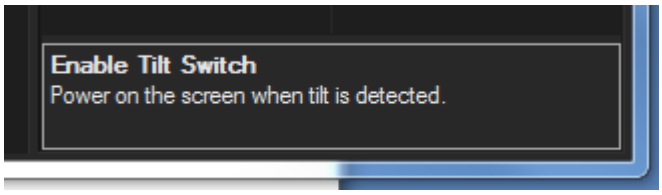
To remove a Pro Control device, highlight it and select the **Delete** button.

Properties

Adjust the **Properties** for each Pro Control Device by highlighting the Pro Control Device from the list. Properties are listed on the far-right side of Pro Control Studio. A description of the property's function is viewable at the bottom of the Property list.

Remotes





Enable Tilt Switch: Activates the touch screen when the controller is moved.

Ignore First Press: If the Tilt Switch is disabled, allows any button to wake up the touch screen, without sending the macro.

Beeper: Provides audible button press feedback for touch screen buttons, all buttons, or no buttons.

Volume (Pro24.z only): Adjusts Beeper volume between 0 and 100.

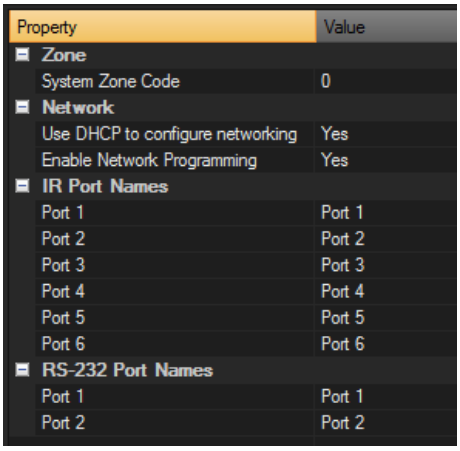
Tone (Pro 24.r only): Adjusts Beeper volume to Low or High.

Backlight Timeout: Adjusts wait time (in seconds) for the backlight to return to idle state. Value 5 to 90.

Backlight Level: Adjusts brightness of the touch screens backlight.

Enable Page Swipe (Pro24.z only): Allows “swiping” gestures to change screens within a page.

Processors



System Zone Code: Setting a unique **System Zone Code** allows individual operation of multiple Pro Control systems located within the same installation or systems located in close proximity to each other (i.e. a close neighbor that has a Pro Control system) without cross communication issues. Programmers are strongly encouraged to change this from the default value. Value 0 to 255.

Channel (ProLink.r only): Choose a different channel when encountering environmental interference or when encountering interference from other Pro Control systems. Value 1 to 13.

Network Key: Encryption key that is unique to every system file. Not related to WiFi security. The default key should be used in most scenarios. Accessed by right-clicking on the Device.

Use DHCP to configure networking: Allows the processor to automatically configure network settings. If false, a static IP address may be assigned (recommended).

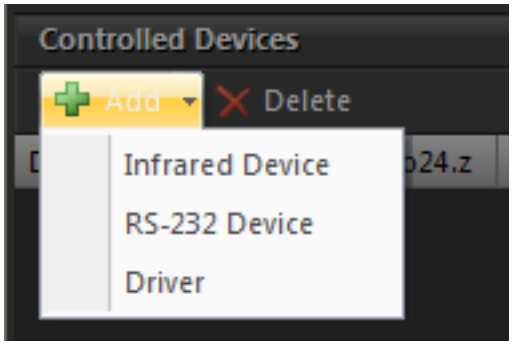
Enable Network Programming: Allows the processor to be programmed over the network. If false, a Pro Control programming cable will be necessary to program.

IR Port Names: Provides the ability to name the IR output ports for easy recognition and IR port routing (TV, DVD, etc.).

RS-232 Port Names (Prolink.z only): Provides the ability to name the RS-232 output ports for easy recognition and port routing (TV, DVD, etc.).

Add Controlled Devices

The **Controlled Devices** section allows the programmer to select the components in the system, such as televisions, receivers, cable boxes, etc. Click the "**Add**" button and select the appropriate control method: **IR, RS-232, or Driver**.



IR: A device controlled via infrared commands, either directly from the handheld controller, or an IR emitter connected to a Pro Control processor.

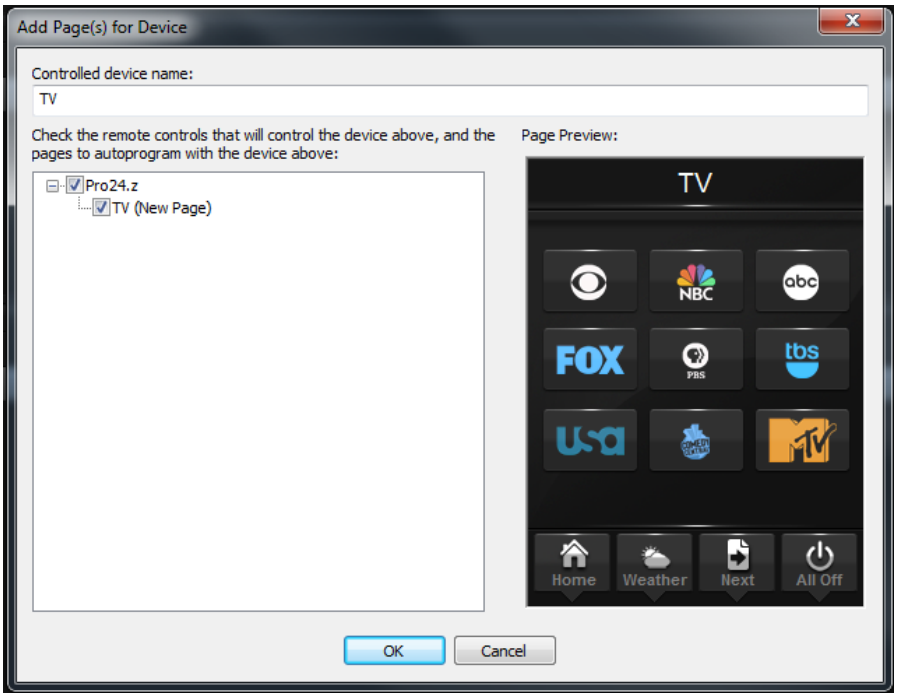
RS-232: A device controlled via RS-232 serial commands (ProLink.z only).

Driver: A device or a widget/non-device (Weather Driver, Clock Driver) that may provide feedback or metadata to the Pro Control system. This option is limited to available drivers (ProLink.z only).

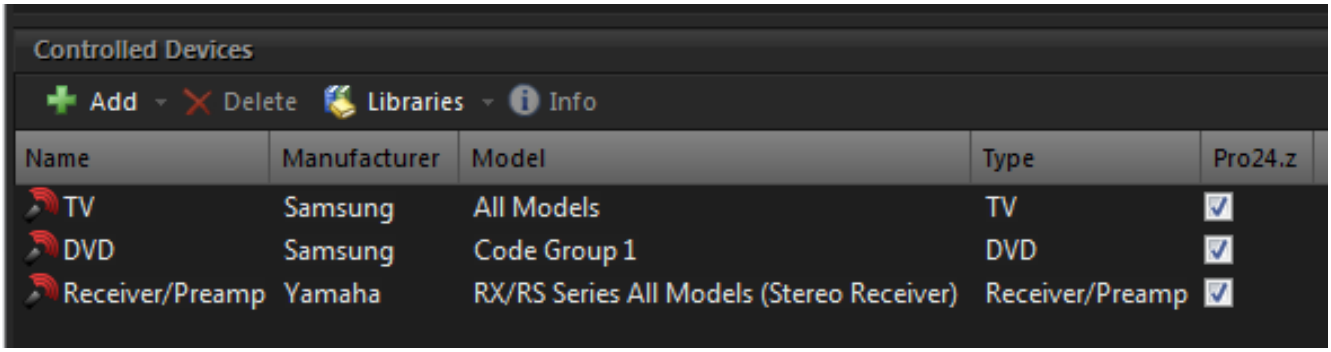
Choose the desired component from the "**Select Remote from Library**" window by clicking on the correct code set. The search bar at the top of the library may be used to quickly locate components.

Note: There will not be a code set for every manufacturer model, as many manufactures reuse codes between similar models. Try a similar model if a particular code set is not available.

After selecting a Controlled Device from the Library, Pro Control Studio will suggest Pages for that device. Click the **Suggested Page** to preview. The Controlled Device may be renamed (e.g. "Bedroom TV").

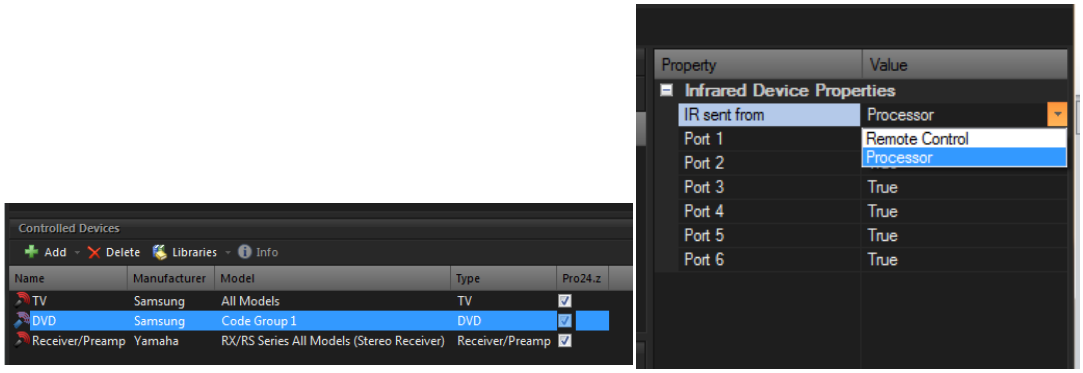


The selected component will appear in the "**Controlled Devices**" section. Repeat the process for all components to be controlled.

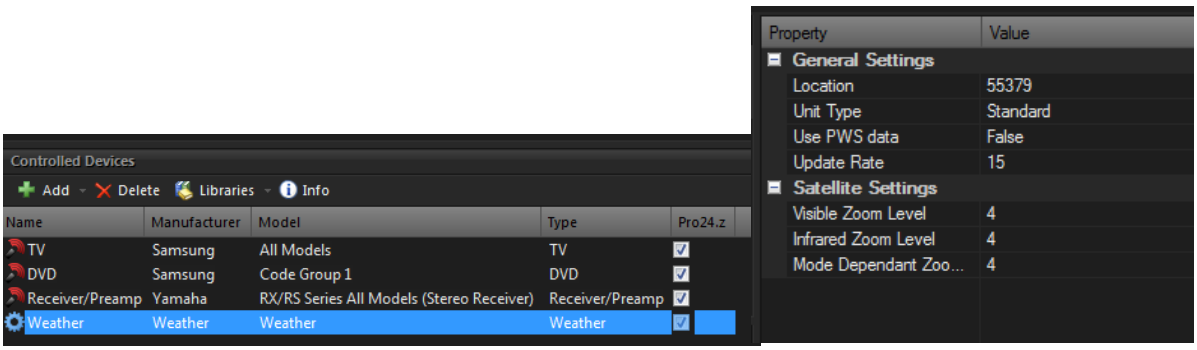


Properties

Adjust the properties for each controlled device. Use the "**IR sent from**" field to determine if the IR commands for this component will be issued from the handheld controller or from an IR emitter connected to the processor. If the IR command is issued from the processor, the command may be routed through any (or all) ports as necessary. If the system contains multiple devices using the same IR code set (e.g. cable boxes), a command may be routed to a specific port to eliminate cross-communication.



Continue to adjust the properties for RS-232 controlled devices (ProLink.z only) by selecting the appropriate port assignment for the controlled device and communication settings (Baud Rate, etc.). Driver properties (ProLink.z only) may be adjusted in a similar manner, options will vary by device.

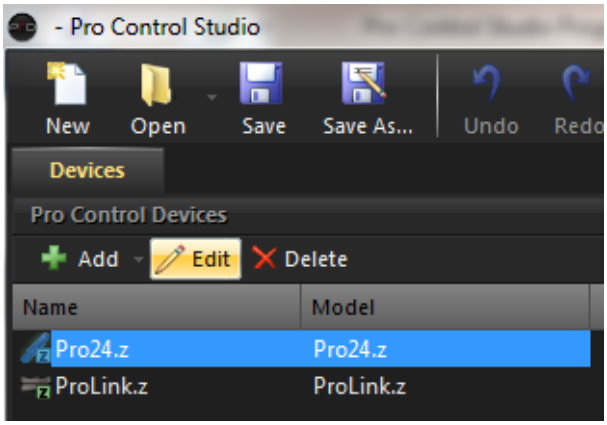


Learning IR Commands

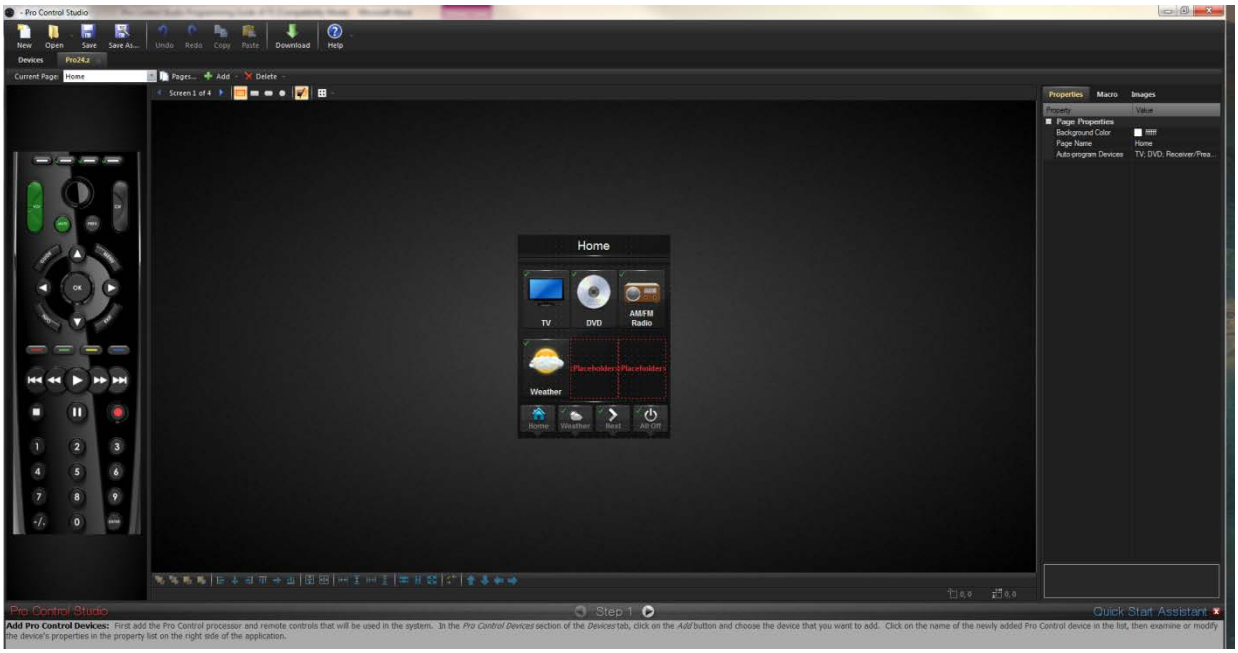
See **Appendix B** for instructions and information regarding IR learning.

Pages

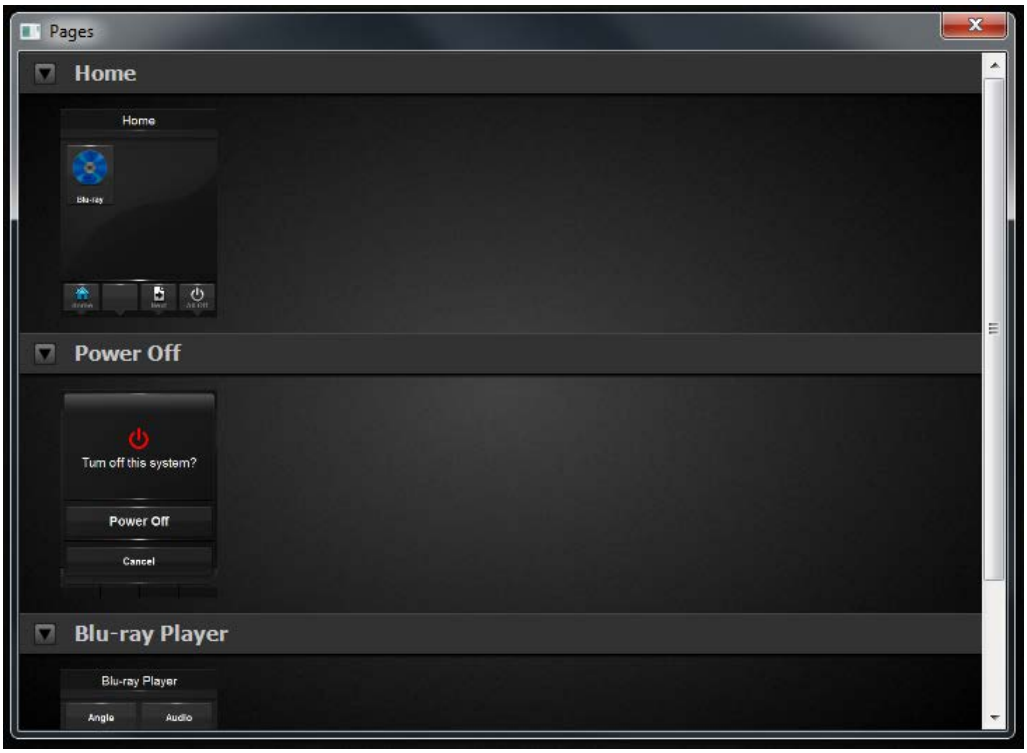
Select the remote control (Pro24.z, in this example) from the list of Pro Control Devices, and click the "**Edit**" button.



The resulting window presents the interface for programming the remote control. A view of the hard button portion of the remote is shown to the left while the color touch screen resides in the center of the program. The right side of the program is where the designer can assign, change and/or manipulate the desired functionality and appearance.

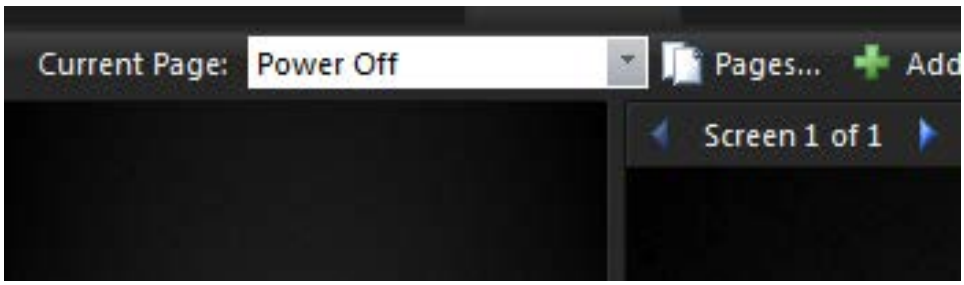


The Pages currently on the controller may be viewed by selecting the "**Pages…**" button at the top of the programming window. This will open a separate window showing all pages and frames currently on the selected controller.



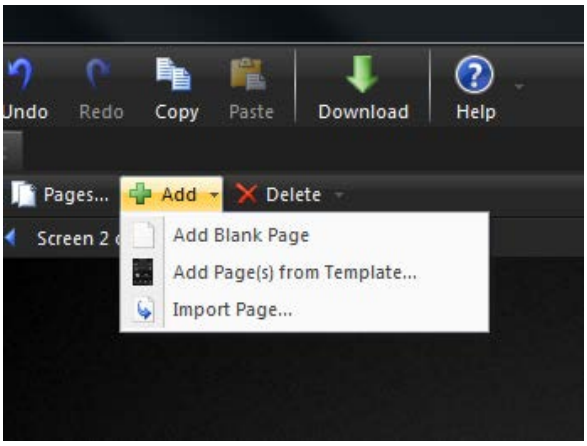
A Page may be selected for programming from this window by double-clicking on it. Additional Screens may be added to a Page by right-clicking on the Page**>Insert Blank Screen**.

Pages may also be selected for programming by using the pull-down list "**Current Page:**" on the top toolbar.



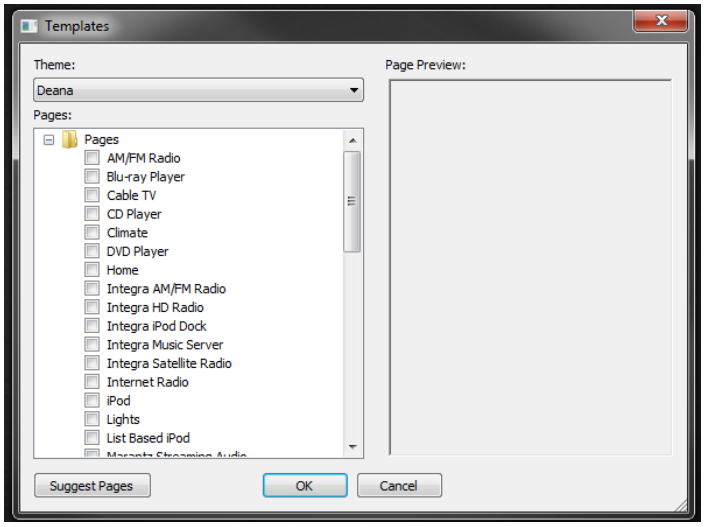
Adding Pages

To add more Pages to the Pro Control remote, select the "**Add**" button and choose "**Add Blank Page**", "**Add Page(s) from Template**", or "**Import Page**"



Adding Pages from Template

When adding pages from Template, choose a Theme and select the desired pages by placing a checkmark in the corresponding box. The **Suggest Pages** feature auto-selects pages based on the Controlled Devices added to the system. The Template Pages are completely customizable, and may be modified to suit the needs of the project.

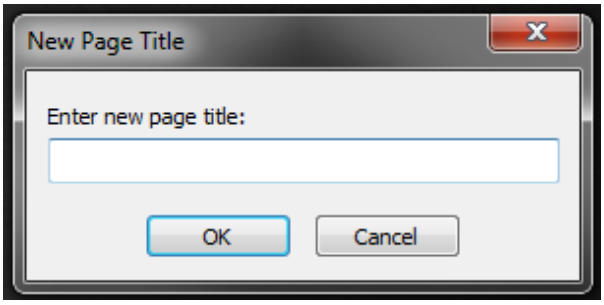


PRO CONTROL

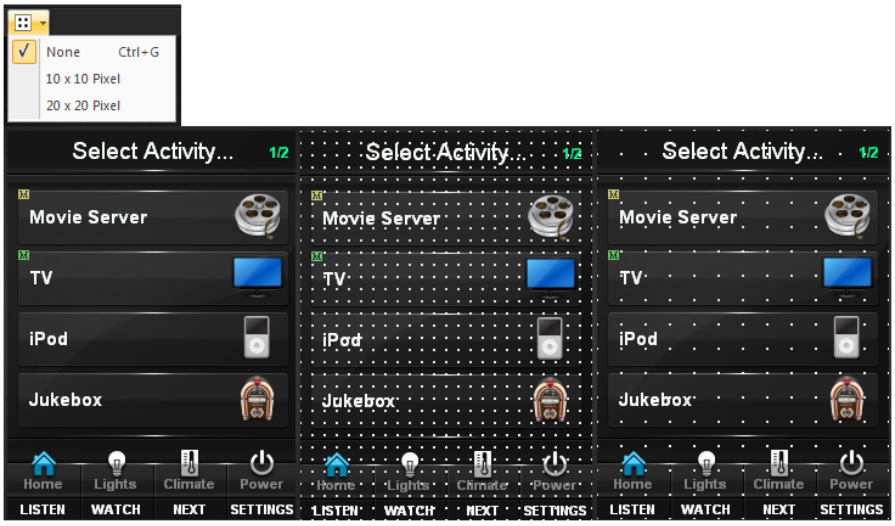
Each Page may contain multiple Screens. Screens provide expansion of a single page when more space is needed. Screens are reflected by the green numbers in the upper right hand corner of the touch screen. The auto program application automatically links one of the buttons to the corresponding screen. The screens are viewable in the "**Pages…**" window.

Creating Pages

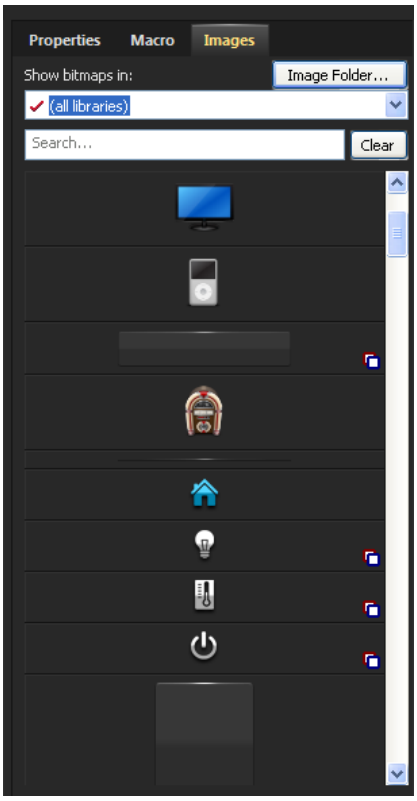
When adding a Blank Page, the "**New Page Title**" window will appear and prompt for a page name (e.g. Home Page, Watch TV, etc.). Creating a blank page will result in a blank screen that may be customized to suit the system.



Pro Control Studio features an interchangeable grid which the programmer may find useful when designing the layout. It can be set to none, 10x10, or 20x20 to align multiple buttons on a page.



The "**Images**" tab on the right side of Pro Control Studio contains several graphic icons to construct a page from scratch, or modify an existing page. They may be placed on the touch panel screen by dragging and dropping to the desired location.



Toolbars

Pro Control Studio features "**toolbars**" used to make changes to any touch panel button in reference. The programmer may adjust button layering, alignment, position, size, location, relative position, and distribution on the page. Placing the cursor on a tool will explain the function.

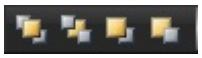
Top Toolbar:

Toggle left and right between different screens on the selected page.

Button selection and creation bar, use the red square button to select and manipulate buttons on the screen. Rectangle, rounded rectangle, and ellipse draw buttons are also available here.

Visible toggle allowing the user to see hidden buttons which are tied to the visible driver binding.

Bottom Toolbar:



Moves a selected button to the back, front, or any layer in between. Helps create layers while using overlapping or invisible buttons.

Aligns multiple buttons in reference to the last button selected, i.e. pressing the Align Left key will bring all selected buttons to the same left position coordinates of the last button selected.

Center the selected button either vertical or horizontal.

Equally spaces multiple buttons between each other across, top down, horizontally, and vertically.

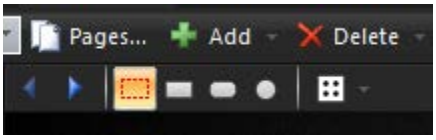
Sizes multiple buttons in reference to the last button selected, i.e. pressing the same size key will make all objects the same size as the last button that was selected.

Styles multiple objects in reference to the last button selected. This applies to button options, text format, and border format only.

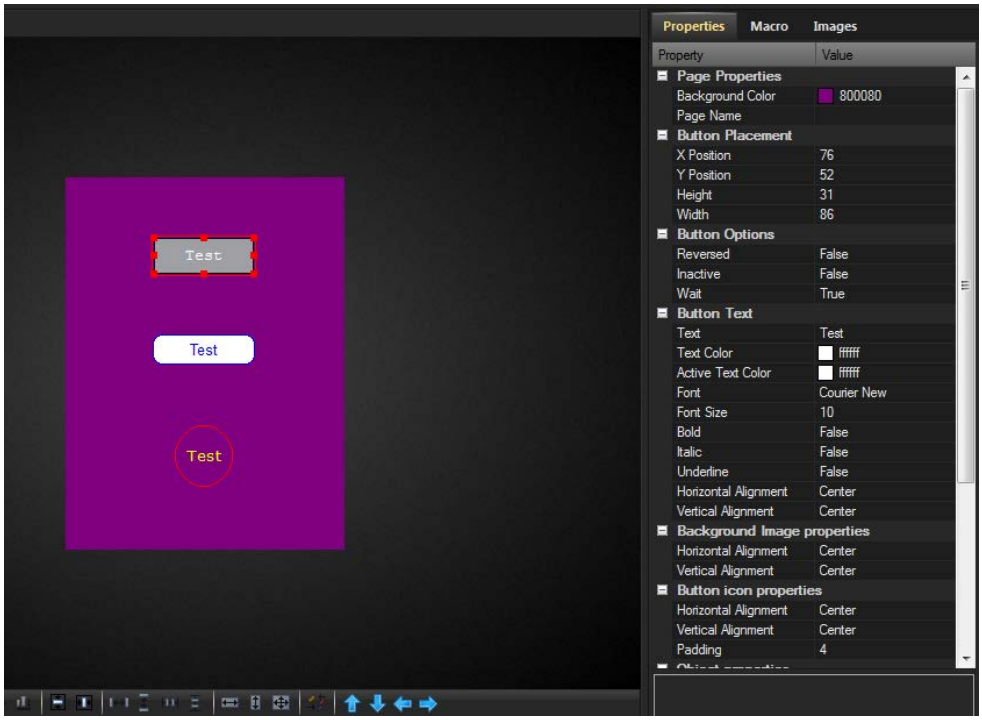
Moves the selected objects up, down, left, and right, by one pixel.

First set of numbers is the current coordinates of the cursor. The second set of numbers is the width and height of the current selected button.

Located above the programming window, several button draw options are available. These tools allow the programmer to draw buttons in several shapes as needed.



The **Selection** tool (red dashed box shown above) allows the programmer to select a button by clicking it, for purposes of adjusting size, properties, location, etc. Multiple buttons may be selected by holding the "SHIFT" key on the keyboard while selecting buttons.

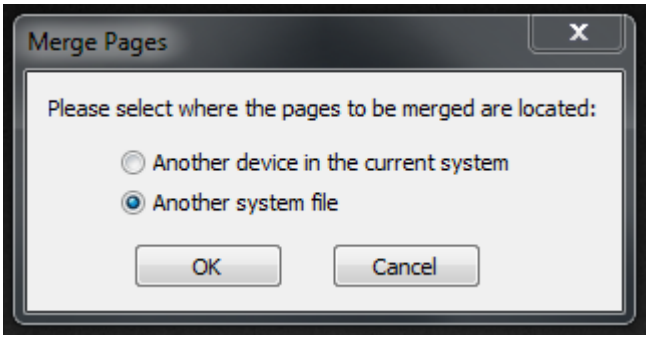


Using the "**Properties**" tab, customize the appearance of the Buttons and Page as desired, including Background Color, Button Color (Normal and/or Active), adding Text, Font, Line (border) Width, Line Color, Alignment, and more.

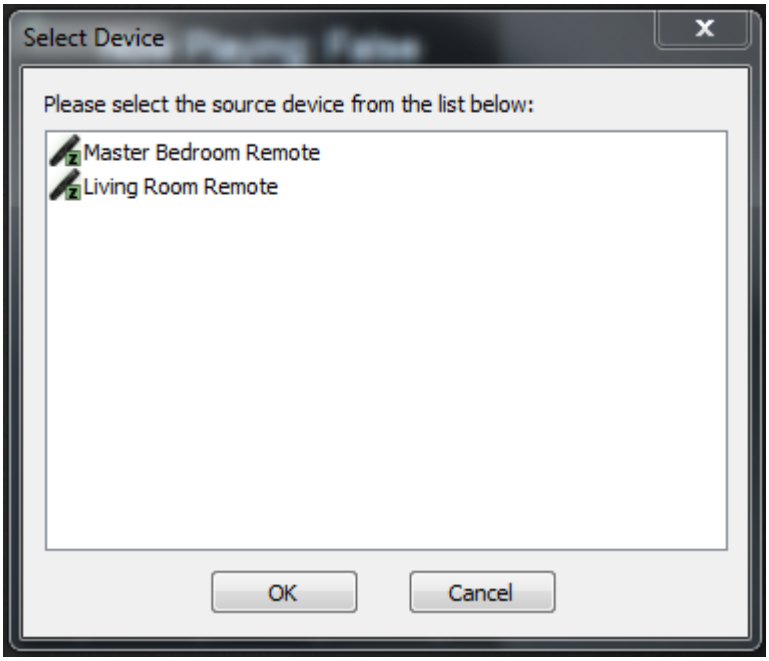
Importing (Merge) Pages

Merge Pages allows the programmer to **Import** a Page from a similar Pro Control remote created earlier. This allows re-use of a pre-programmed Page in multiple systems. Select "**Import Page**" from the "**Add**" pull-down list.

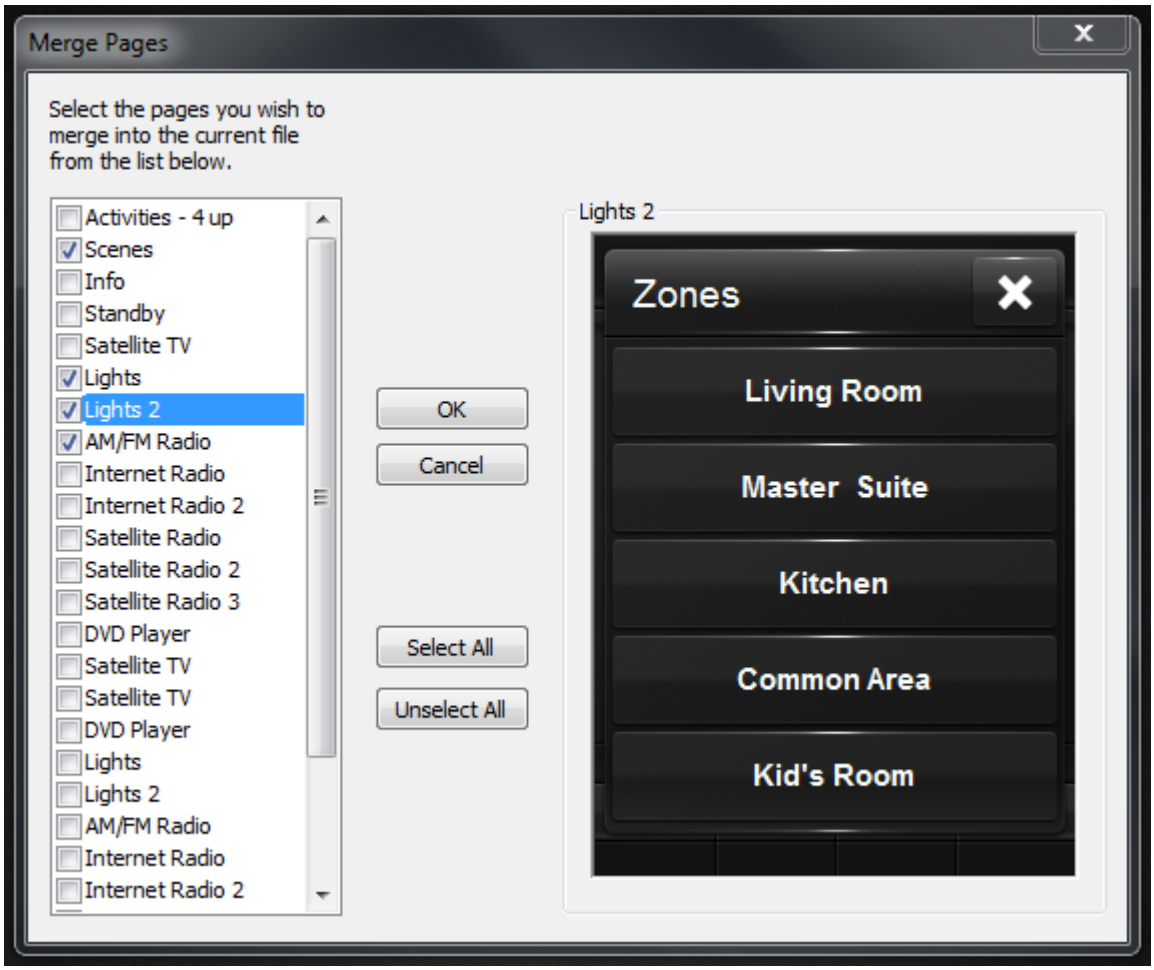
From the resulting window, choose the location of the Pro Control Device.



Navigate to the proper location, and choose the **System File** containing the desired Device.



Choose the Device containing the Page(s) to Import.



Select the Page(s) to add, and select "**OK**". The Pages will be **Imported** to the current Pro Control remote.

Editing Added Pages

Selecting the "**Pages…**" Button above the programming window allows viewing and editing of all Pages and Screens on the selected Pro Control Device.

Right-clicking on a Page or Screen allows Inserting, Deleting, Copy/Paste, and relocation of the selected Page or Screen.

Auto-Programming

The Templates utilize an **auto-programming** feature which assigns commands to some buttons based on the list of devices to be controlled. For example, the DVD Player page has commands automatically assigned for Play, Fast Forward, etc.

A green "check-mark" on the top left corner of a Button indicates a Macro exists on that Button. Selecting a Button allows the programmer to view and edit the Macro as necessary.

The green hard buttons (volume and mute in this example) indicates a "**Global**" button, meaning the Macro assigned to those buttons is the same for each page. Any hard button may be configured as Global by right-clicking and selecting "**Make This Key Global**"

If necessary, the auto programming may be modified. The "**Properties**" tab and "**Macro**" tab allow altering a Macro if desired.

Pro Control Studio's auto-program feature will automatically populate a Home Page with icons representing the various sources or activities, based on the Pages or Controlled Devices added to the system. It is recommended that all Controlled Devices and Activities are added prior to rearranging the icons. Adding new Devices or Pages may disrupt the customized configuration.

The "**Placeholders**" are not visible on the final program if those activities are left empty.

Adding Driver Feedback (Pro24.z & ProLink.z only)

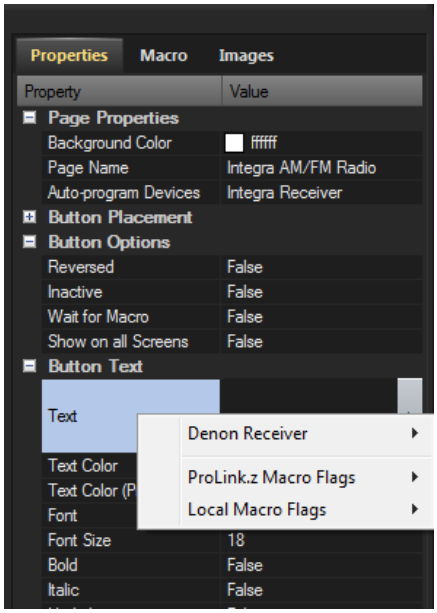
A variety of feedback options may be used to display metadata from installed Drivers.

Button Text Feedback

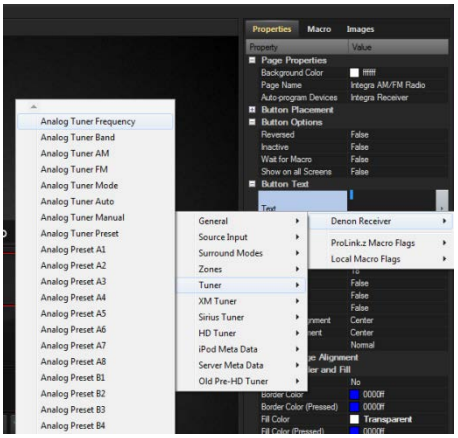
Text feedback allows the user to see, in real-time, the changes made to a system, such as volume status, now playing information, tuner frequency, etc.

To add Text feedback to a button, select the desired button using the **Selection** tool, and navigate to the **Button Properties**. Choose Text color, font, etc.

In the Text entry field, click the "**Arrow**", and select the Driver to poll for information.

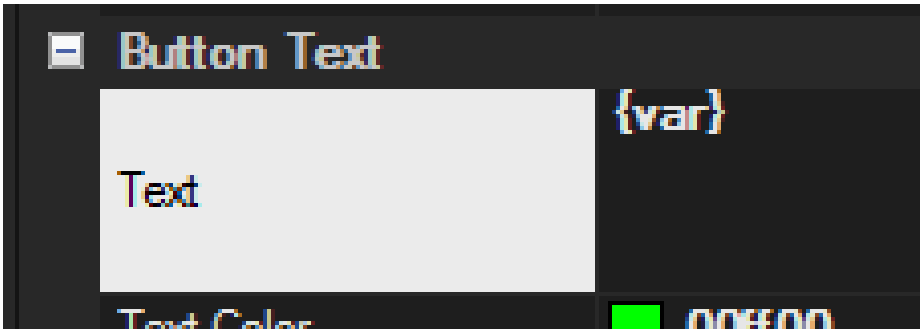


Choose the Variable to display on the button.

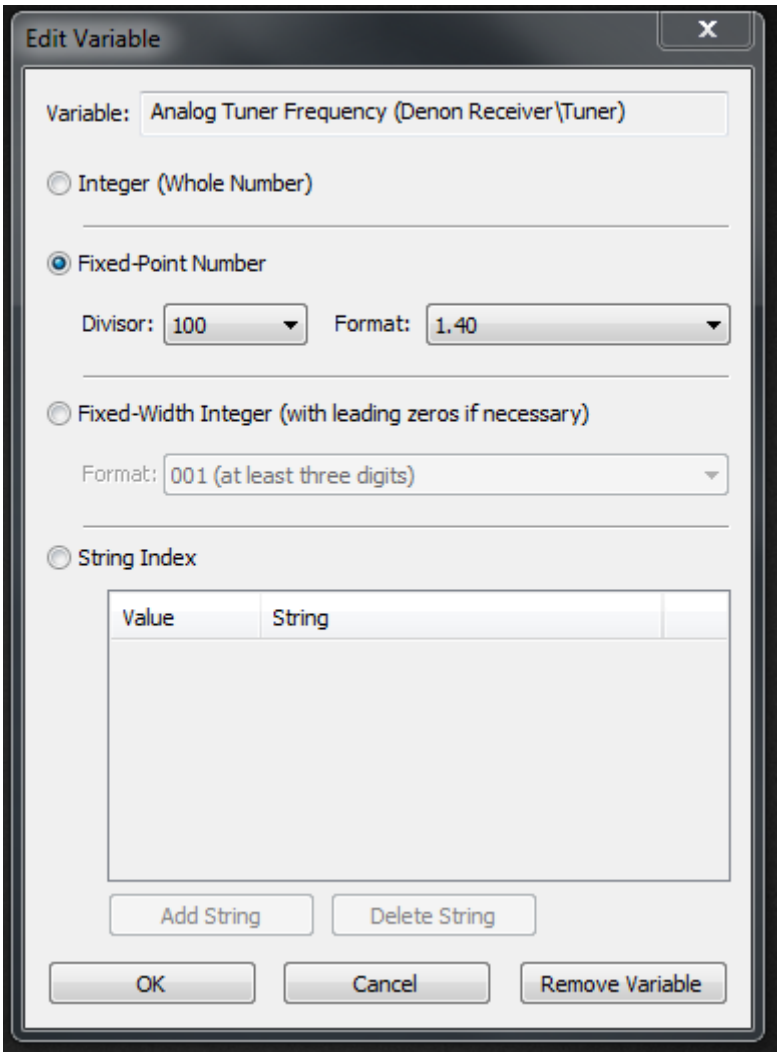


"Placeholder" text will be placed on the button, so the programmer may edit text size, color, font, etc.

The text entry field will represent this Variable with a (var) indicator. Additional text may be added as needed to the field.



To view or remove the Variable, click the (var) indicator.



Button State Feedback

Pro Control Studio allows Button feedback as Reversed (Pressed), Inactive, and Visible states. Any True/False-type Driver Variable may be expressed as a Button Variable.

Reversed

Instructs the button to display the **Reversed** image when assigned. This can provide positive feedback for source selection, power state, etc.

Inactive

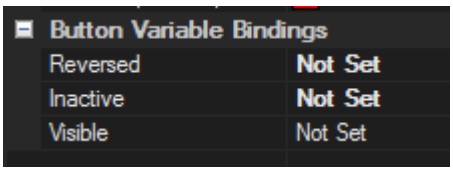
Instructs the button to become unresponsive to button presses. No Macro Steps or button press confirmation will occur.

Visible

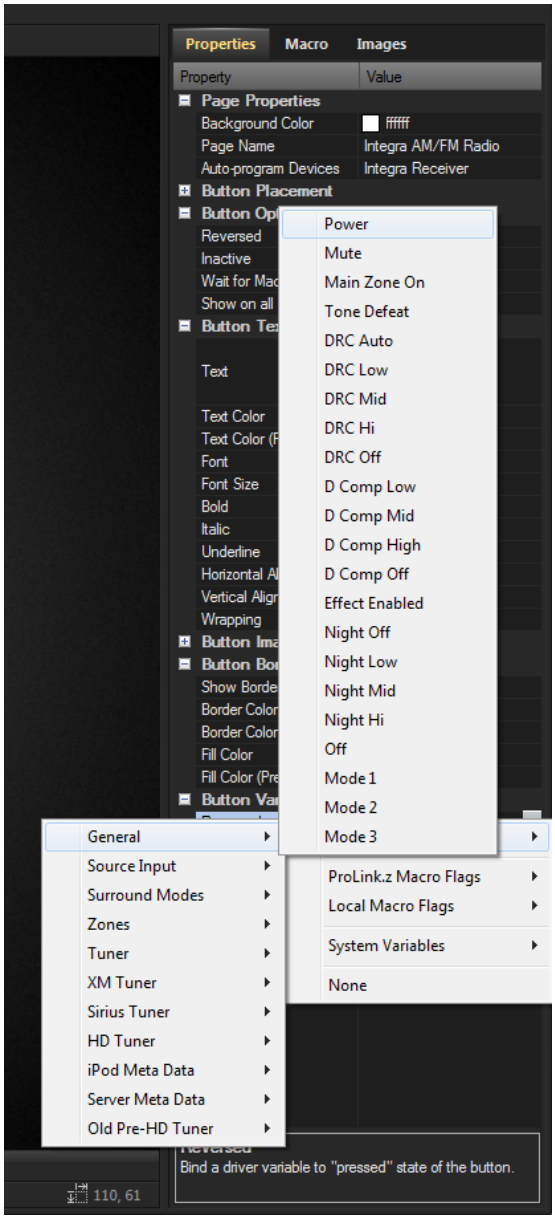
Instructs a button to appear or disappear, based on Driver feedback. Use the "**Show Buttons…"** tool to view hidden buttons.

To assign:

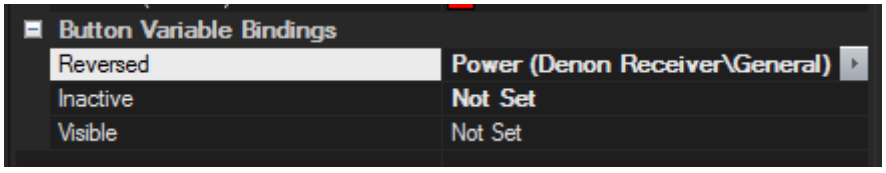
Locate **Button Variable Bindings** under **Button Properties**.



Assign the Button Variable Binding to the desired Driver information.



The Variable will be displayed in Button Variable Bindings.



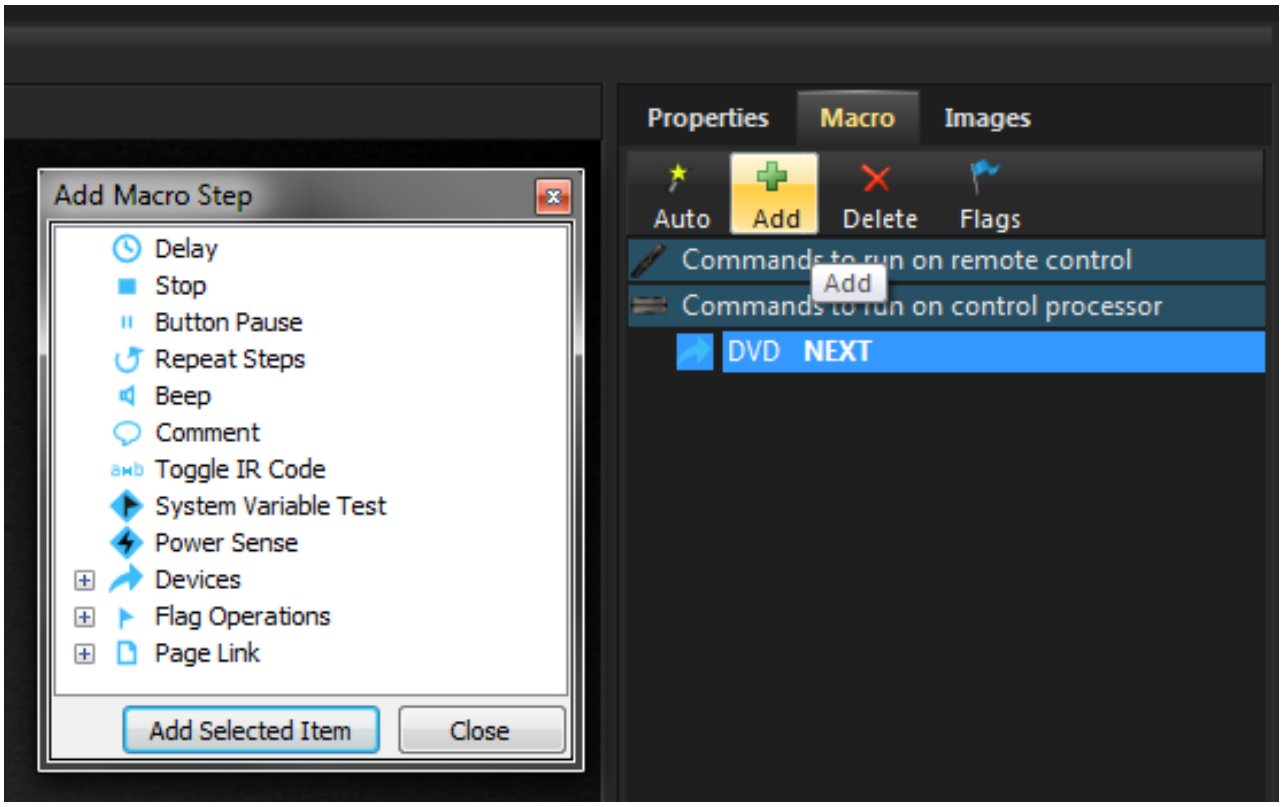
Power On:

Power Off:

Create Macros

A **Macro** allows the programmer to simplify and automate control for the end-user. A Macro may consist of a single command, a Page Link, or a complex series of steps

Steps may be added to the macro by utilizing the "**Add**" button. Selecting "**Add**" opens the "**Add Macro Step**" window which allows the programmer to assign different commands and features to the button. Macro steps run in the order that they are listed, and may be rearranged.



Selecting the "**Delete**" button removes the item in reference. In the illustration, the "**Delete**" button will remove the "NEXT" macro step (highlighted) for the DVD Player Page.

Macro Step Definitions

Delay: Adds an adjustable pause between Macro steps.

Stop: Prevents Macro from running beyond determined point; may be used with conditional logic.

Button Pause: Step causes the Macro to stop executing until the button it is attached to is released, at which time the rest of the macro is executed.

Repeat Steps: Step causes the macro to output a group of steps multiple times. You can choose whether to repeat the steps a fixed number of times or continuously while the button is held down.

Beep: Plays a sound effect during the Macro.

Comment: Allows text entry within a Macro; used for notes or comments.

Toggle IR Code: Causes the macro to alternate between two different IR codes every other time the button is pressed. If you have equipment that uses toggle codes, you must learn each code twice, and then place the two codes within the Toggle IR Code step. Every time the macro is run, it will send out only one of the two codes inside of the Toggle IR Code step, switching back and forth each time the button is pressed.

System Variable Test: Tests the state of any Boolean (true/false) variable from an installed Driver, and allows conditional logic based on the status.

Power Sense: Tests the state of a processor's sense input for presence of voltage (+3 volts), and allows conditional logic based on status.

Button Test: Causes the macro to execute a group of steps ONLY IF the button that the macro is attached to is pressed (or not pressed, or double-clicked, depending on the option selected).

Devices: Allows access to the IR, RS-232, or Driver Libraries for adding a command step to the Macro.

Flags: The Flag step is used to keep track of system status and act based on that status. There are multiple flags available, which you can set or clear under macro control. Later, you can use the "Test Flag" option to take different actions based on whether or not a certain flag is set.

For example, you can use this functionality to make discrete power ON and OFF macros for components for which you have only toggle codes. Use the "Set Flag" option when you turn on the component, the "Clear Flag" when you turn it off, and the "Test Flag" option before you send out the Power code.

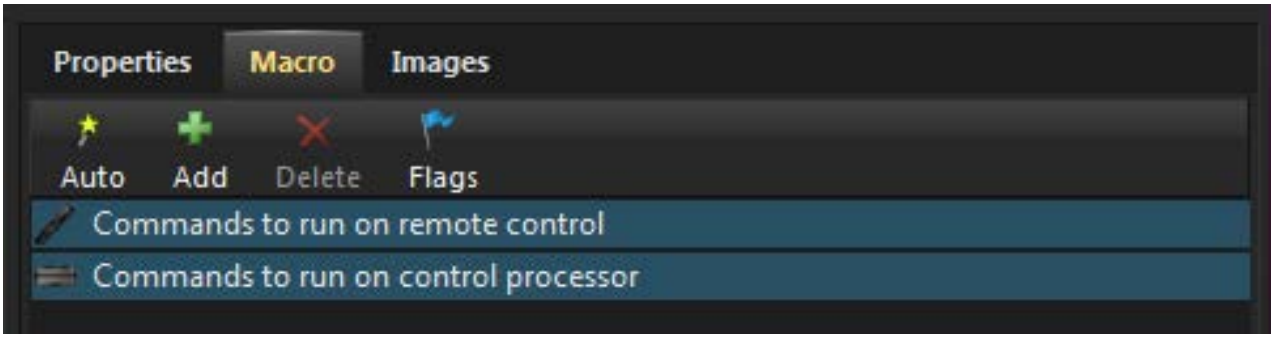
Page Link: The Page Link step causes the macro to change the currently displayed page.

Macro Examples

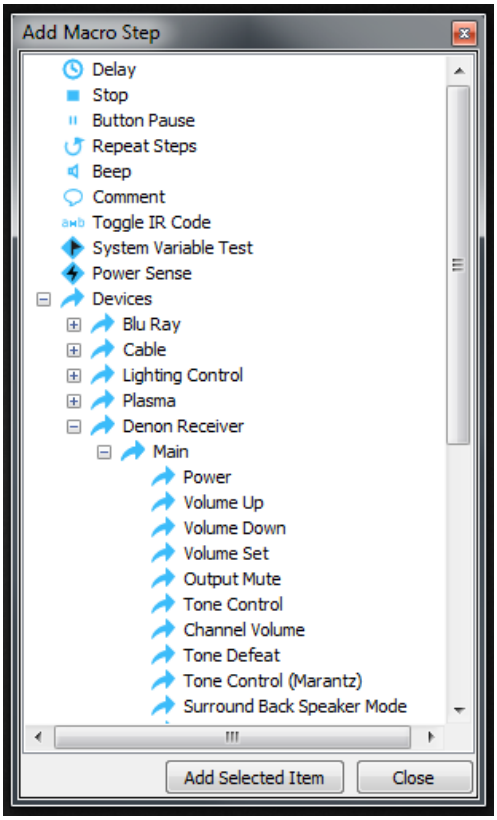
Adding a Command to a Button

A Macro may consist of a single command. To add a "Volume" command to a hard button, select the button by clicking it, ensuring that the "Select Button" tool is engaged. The button will turn RED when selected.

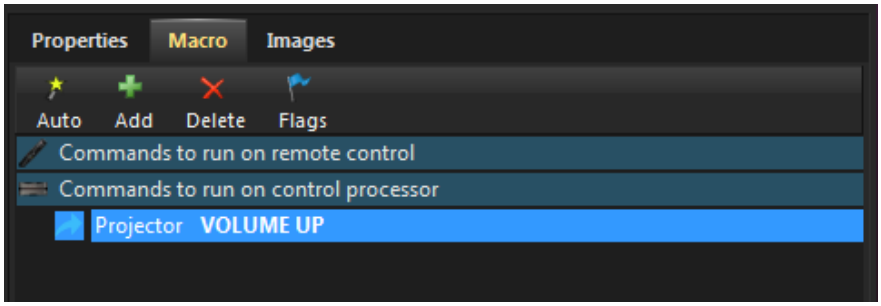
Choose the Macro tab at the upper-right of Pro Control Studio, and select "Add".



The "**Add Macro Step**" window opens, allowing the programmer to access Controlled Devices and macro commands. The window is re-sizable and may be positioned where desired.



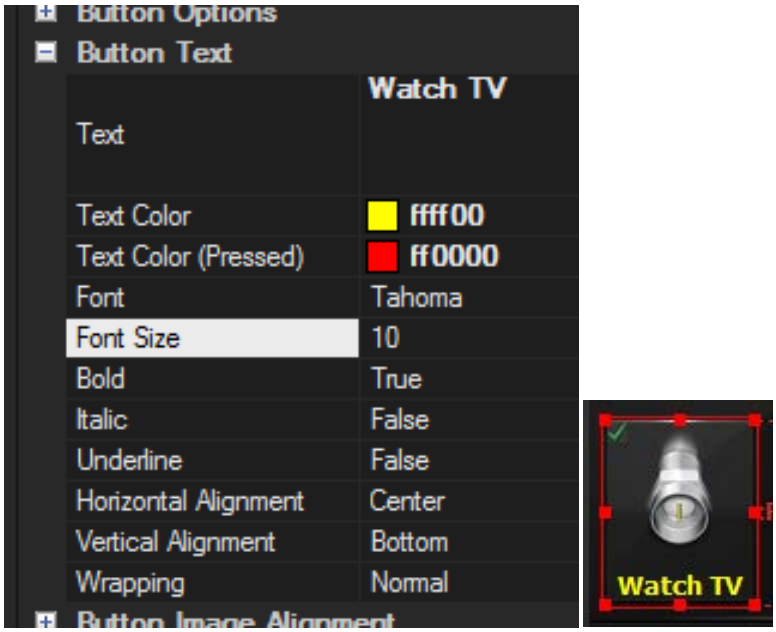
Under "Devices", locate the appropriate Controlled Device. Double-click on the command, and the Macro is complete.



Creating an Activity

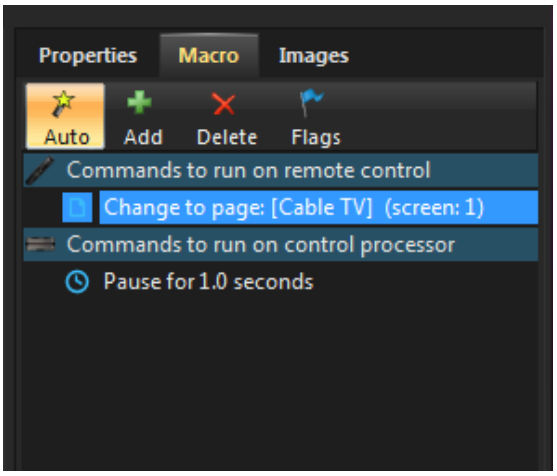
An Activity, in this case **Watch TV**, can be easy for the end-user to understand. In order to simplify and automate this process, several **Controlled Devices** will need to be turned on, appropriate inputs selected, etc.

Rename the auto-programmed “Cable TV” button by selecting the **Properties** tab after selecting the button.



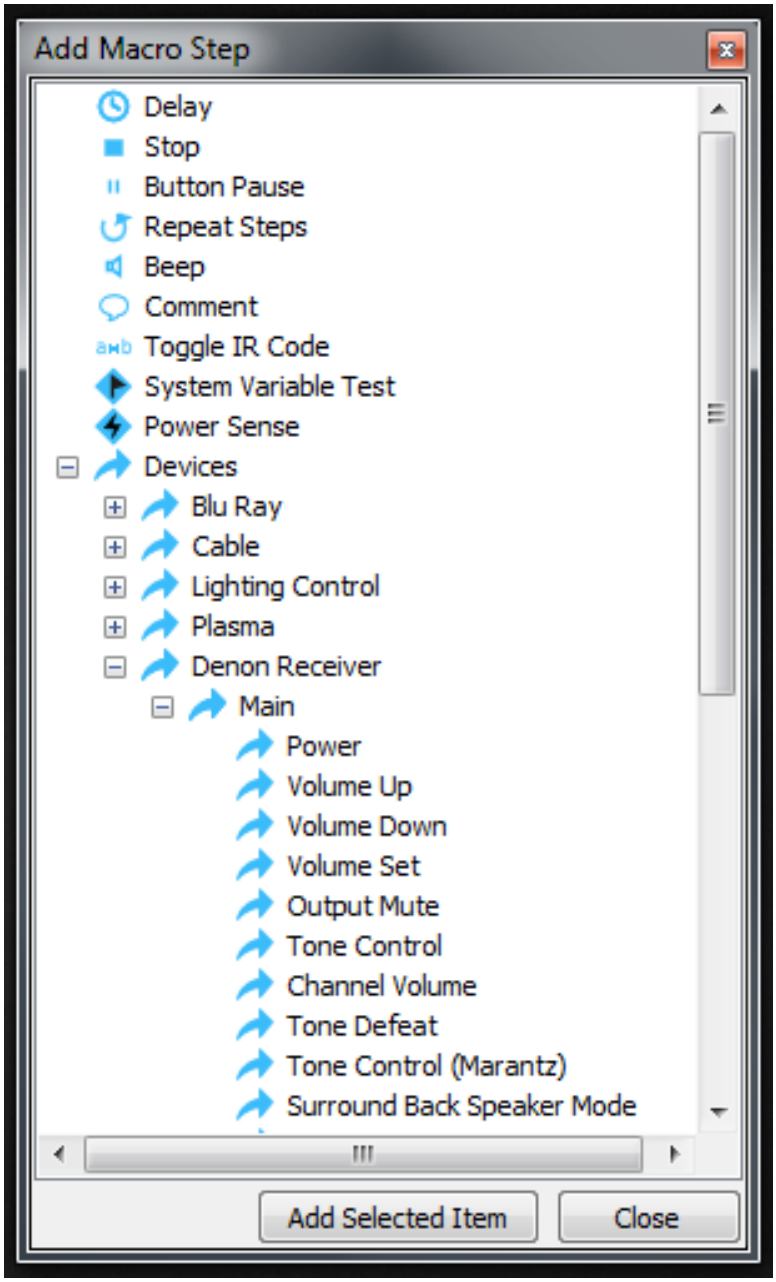
In “**Button Text**” properties, the programmer may edit the button’s text, font, font size, alignment, justification, and text color for both **Normal** (not pressed) and **Active** (pressed) states.

Adjust the existing, auto-programmed Macro on the button by selecting the Macro tab.



The existing Macro contains a **Page Link** to the Cable TV page (on the remote), and a short **Time Delay** on the processor.

To add additional commands, select the "**Add**" button. The "**Add Macro Step**" window opens, allowing the programmer to access Controlled Devices and macro commands.



From the "**Add Macro Step**" window, find the required commands to operate the equipment. In this example, there is an IR controlled satellite TV box, an RS-232 controlled TV, and a Driver controlled A/V receiver.

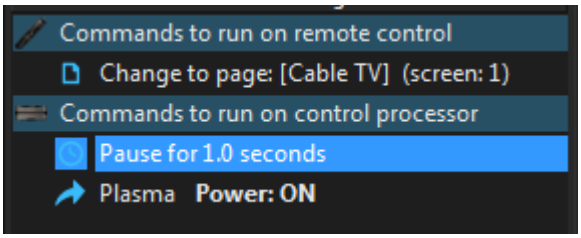
To add commands, select:

Device> (name of Controlled Device)> (name of command needed)

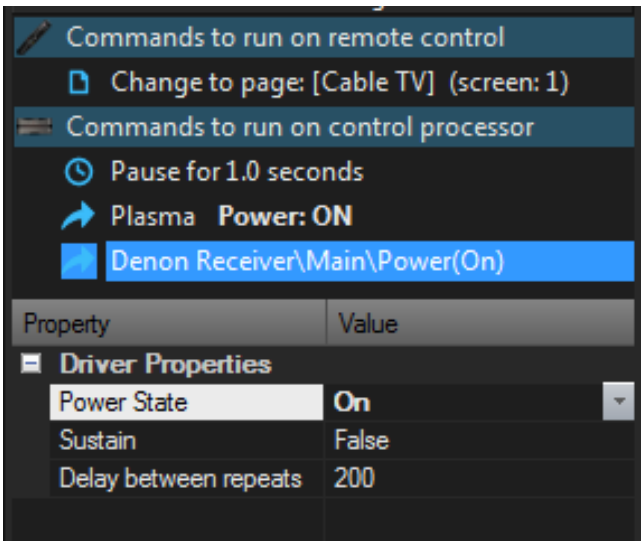
In this example:

Device>Plasma>Power: ON

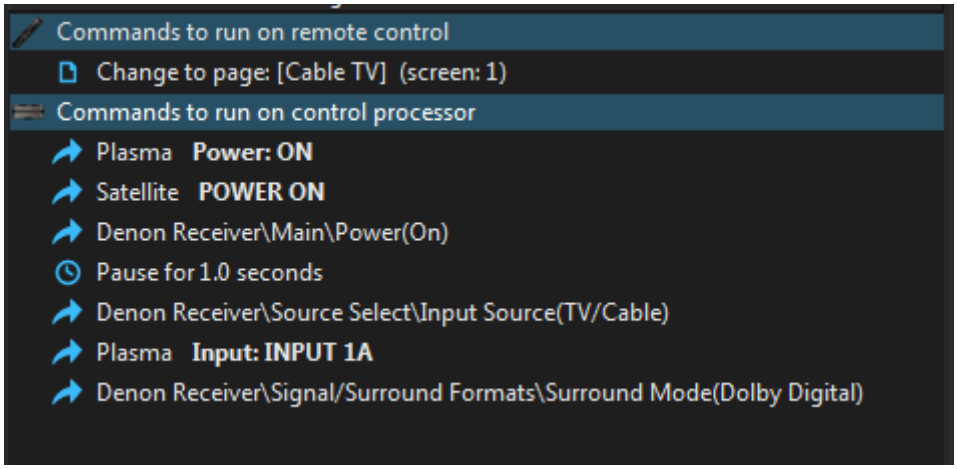
Double-clicking on the command will add it to the Macro.



Continue to add the required commands in the same manner. Driver commands may have parameters adjustable by the programmer, as shown:



After all required commands have been added to the Macro, the order may be rearranged as needed by dragging the command up or down the list.



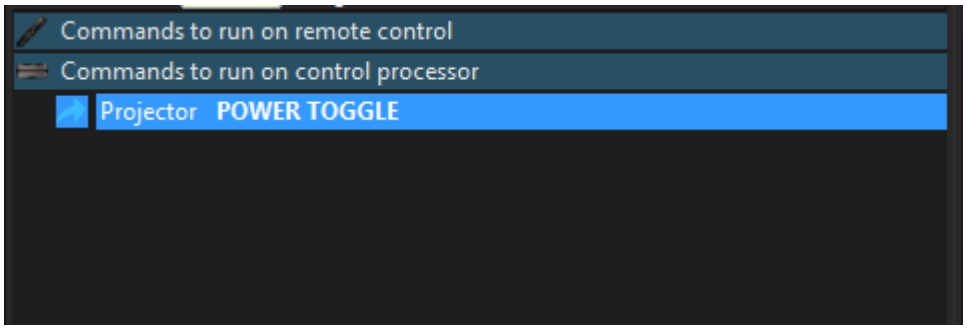
If needed, other commands may be added to the Macro. See **Macro Step Definitions** for more information.

Using Power Sensing

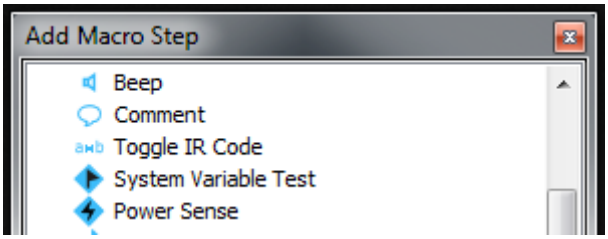
Occasionally a discrete IR code may not be available for a Controlled Device. If the device outputs voltage when powered on, like a projector or cable box, the ProLink processor can monitor the power state and act accordingly.

In this example, a projector with a +12 volt DC output for a screen trigger is used. Connect the trigger to one of the **Sense Inputs** of the processor.

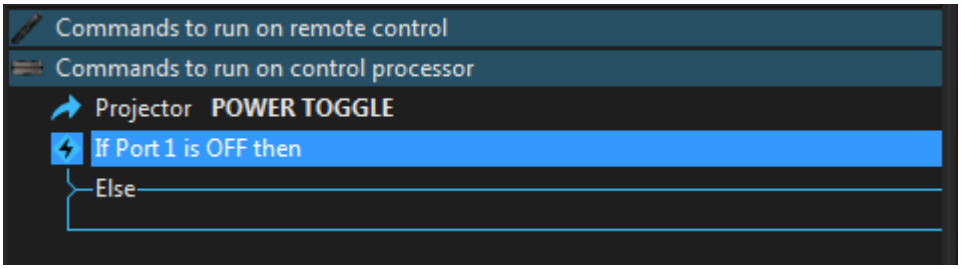
In the Macro, add the toggling “Power” command.



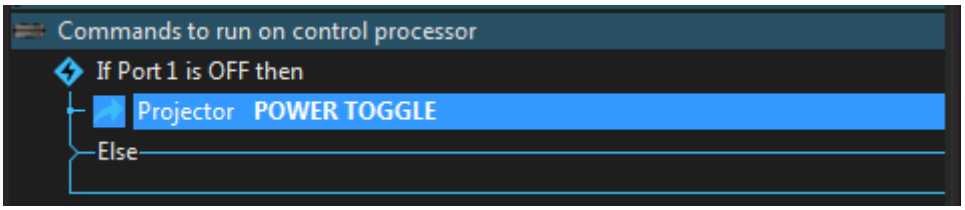
To monitor the Sense Input, use the Macro Step “Power Sense”



When “Power Sense” is added to the Macro, a **Conditional Statement** is used. This allows the processor to execute Macro Steps, based on the status of the Sense Input.



Drag the “POWER TOGGLE” command into the appropriate bracket of the Conditional Statement.



How it works:

Step 1: The Macro, seeing the **Power Sense** command, tells the processor to check Port 1 for any voltage present.

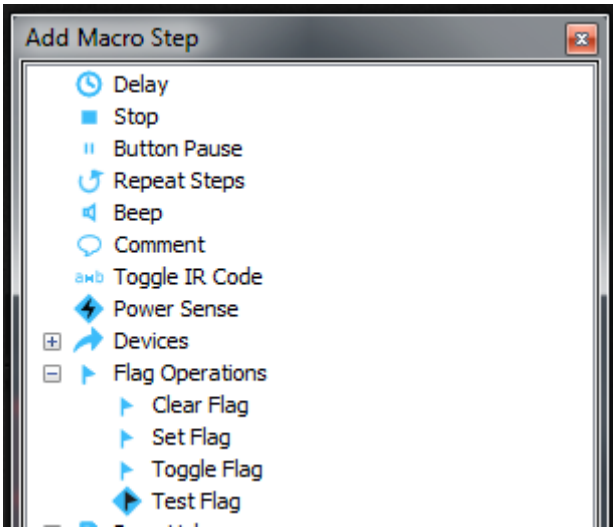
Step 2: If no voltage is present (**OFF**), the processor executes the command “POWER TOGGLE”, turning the device **ON** (the toggle command reverses the current power state of the device).

Step 3: If voltage is present (**ELSE**), the macro does nothing, as there is no command in the **ELSE** bracket of the Conditional Statement.

Using Flags

Pro Control processors and handheld controllers each have 255 nameable Variables called **Flags**. Flags are a powerful tool for tracking status, such as power state, source selection, and more.

Each Flag has 4 possible operations available as a Macro Step: Set, Clear, Toggle, and Test.



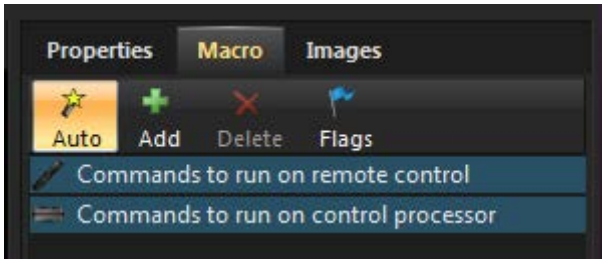
The "**Clear**" operation sets the Flag's value to "False."

The "**Set**" operation sets the Flag's value to "True."

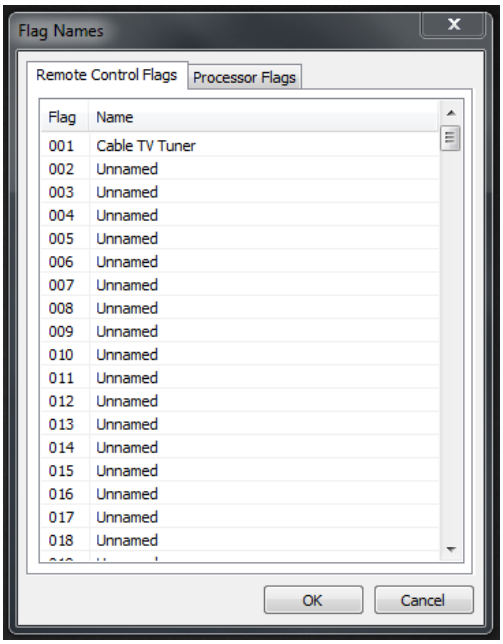
The "**Toggle**" operation inverts the Flag's current value (True to False/False to True).

The "**Test**" operation allows a conditional statement to execute Macro commands, based on a Flag's current value.

Flags may be named according to the desired use. Access the Flags via the "**Flag**" button in the Macro tab.



Note that the Remote Control and Processor each have a unique set of 255 Flags.



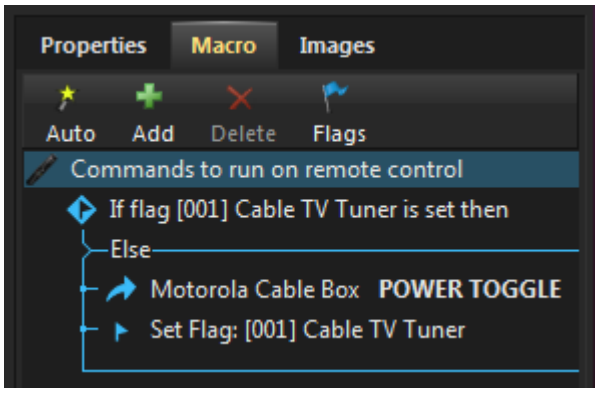
Simulating Discrete IR Commands with Flags

Flags may be used to simulate discrete control of a device that only has a toggle power command. In the example below, a cable TV tuner with non-discrete IR power commands is controlled in an Activity, ensuring the power state is ON.

Note: Flags are tracked by the Pro Control device only. External changes to the system (OEM remote, device buttons, power failure) may cause Flags to lose track of current power state.

In order to use Flags in this application, the programmer must be certain to **Set** the Flag (Cable TV Tuner, in this example) each time the device is powered **ON**. The same Flag must be **Cleared** each time the device is powered **OFF**. The system is tracking the Flag's status, rather than the actual power status of the device. This is critical for proper operation.

To simulate a discrete "Power ON" command:

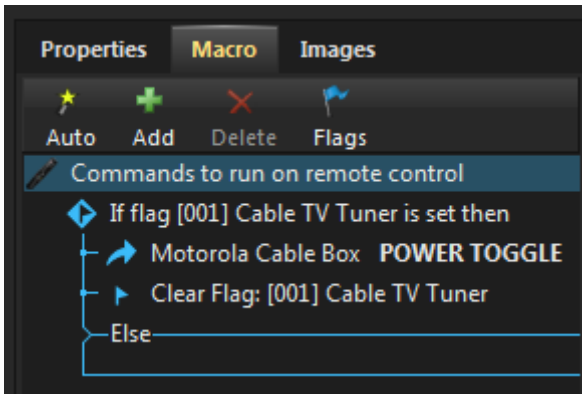


For the "Power ON" Macro, a **Test Flag** operation has been added to the Macro. This gives a conditional statement to test the current value of the selected Flag (Cable TV Tuner).

If the Flag is **Set** (True), then assume the device is ON. The top bracket of the conditional statement will be left blank (no commands). The device will remain ON.

Else, indicating that the Flag is **Cleared** (False), indicates the device is OFF. Insert the toggle power command to turn the device ON, and **Set** the Flag (Cable TV Tuner) to indicate the device is ON next time it is tested.

To simulate a discrete "Power OFF" command:



For the "Power OFF" Macro, a **Test Flag** operation has been added to the Macro. This gives a conditional statement to test the current value of the selected Flag (Cable TV Tuner).

If the Flag is **Set** (True), then assume the device is ON. Insert the toggle power command to turn the device OFF, and **Clear** the Flag (Cable TV Tuner) to indicate the device is OFF next time it is tested.

Else, indicating the Flag is **Cleared** (False), indicates the device is OFF. The bottom bracket of the conditional statement will be left blank (no commands). The device will remain OFF.

Using Button Variables with Flags

Button Variables (available in **Button Properties**) may be used in association with Flags. This can provide feedback of the Flag status to the user.

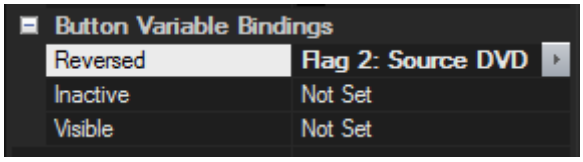
The example demonstrates using Flags to indicate the current **Activity** selected. The Activity buttons (DVD, Cable TV) are programmed to reflect the current **Activity** by showing their **Pressed** (or **Reversed**) state.

The **Button Text** for each Activity button has been programmed to display RED text for the **Pressed** state, and WHITE text when not pressed.

A Flag is designated for each Activity, and named as described earlier. Select "**Button Variable Bindings**", found in the properties of each Activity button. Set the "**Reversed**" Variable to correlate with the Flag for the respective Activity.

TV Activity:

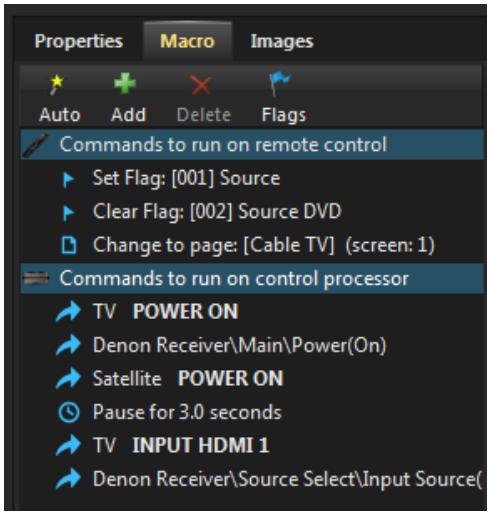
DVD Activity:



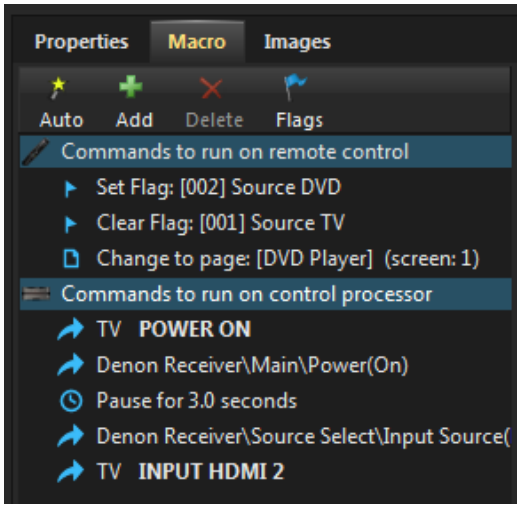
In the Macro for each Activity, **Set** the appropriate Flag, and **Clear** the Flag for the unselected Activity. Only 1 Flag should be selected at a time in this application.

Note: This example is using the Flags on the Remote Control.

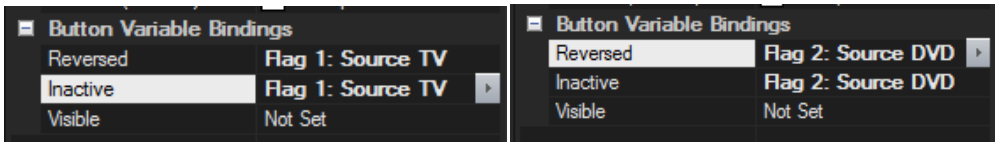
TV Activity:



DVD Activity:



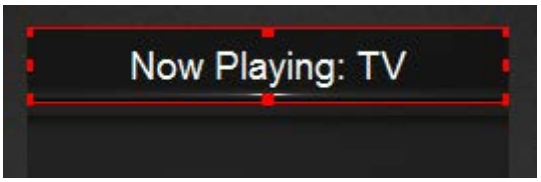
Additionally, multiple variables may be **bound** to a single button. Expanding on the previous example, the programmer may choose to "lock", or render a button **Inactive**, if an Activity is selected. This would prevent the Macro from executing if the Activity was already in use.



Using Variable Text with Flags

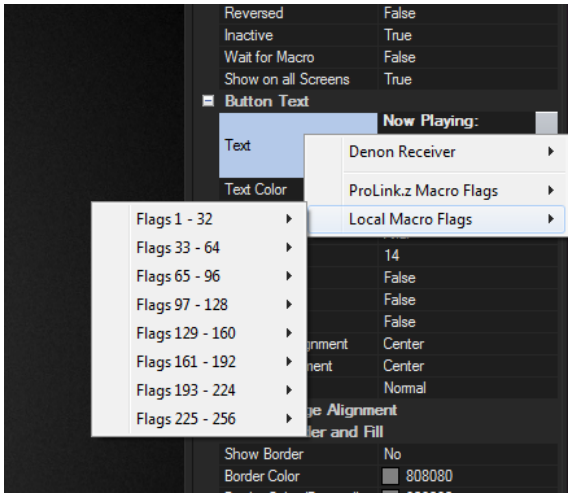
Button Text may be defined, based on the status of a Flag. Expanding on the previous example, the top button on the Activity selection Page will update its text to reflect the selected Activity.

Select the button, using the **Selection** tool, by clicking it.

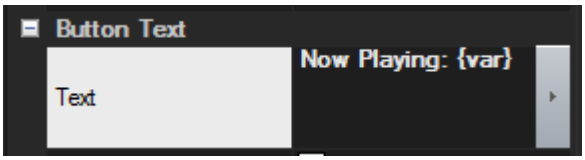


Under **Button Properties**, locate the **Button Text** property. Enter any desired text, in this example "Now Playing:"

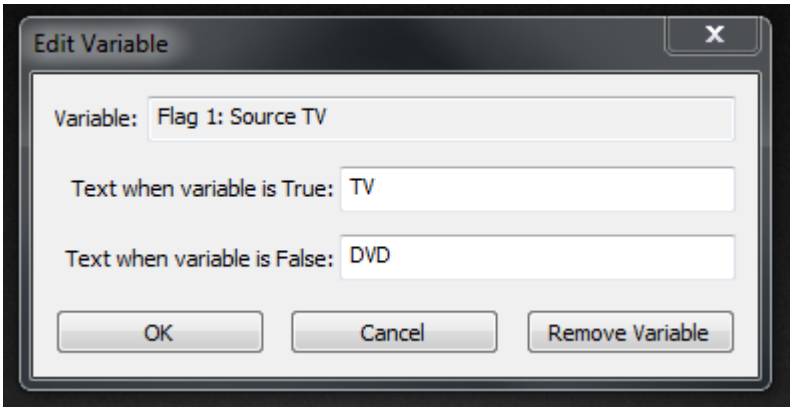
To add a **Text Variable**, select the "**Arrow**" in the text entry field. From the pull-down list, select **Local Macro Flags> (choose the designated Flag).**



A **Variable** will be entered into the text field.



Click on the Variable to edit displayed text.

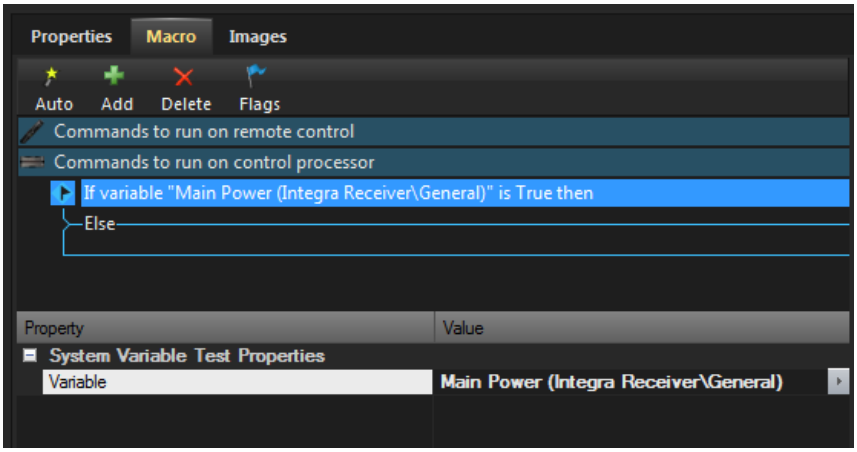


The handheld controller will now reflect the current selected Activity on the button.

Testing Two-way Variables

Pro Control Studio allows the programmer to test **Driver Variables** as a Macro Step. This provides the ability to create a more intelligent system by relying on feedback directly from a Driver, rather than Flags or other, less certain variables or executing unnecessary Macro Steps.

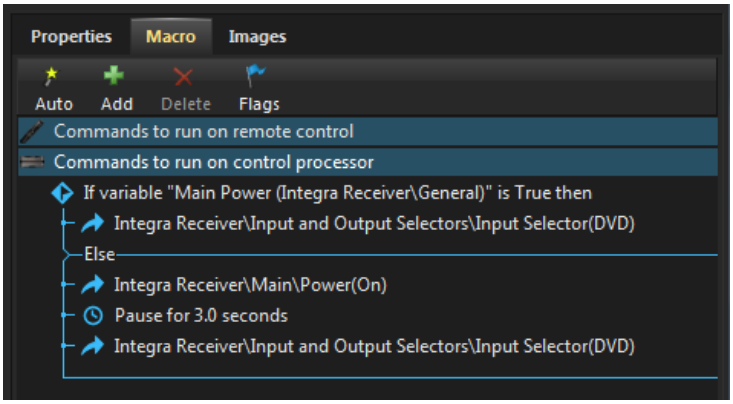
Select "**System Variable Test**" from the "**Add Macro Step**" window.



Under "**Properties**", select the Driver and the Variable to test.

Note: Only Boolean (True/False) Variables may be tested.

The Macro will confirm the Driver's status, and allow the programmer to base conditional logic within the Macro.

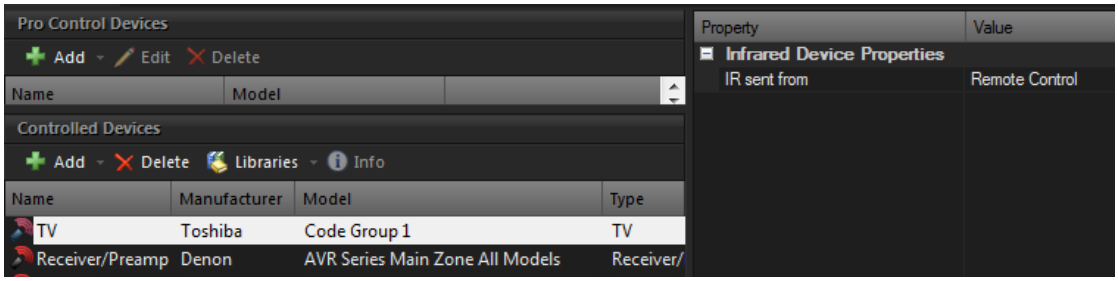


IR/RF Macro

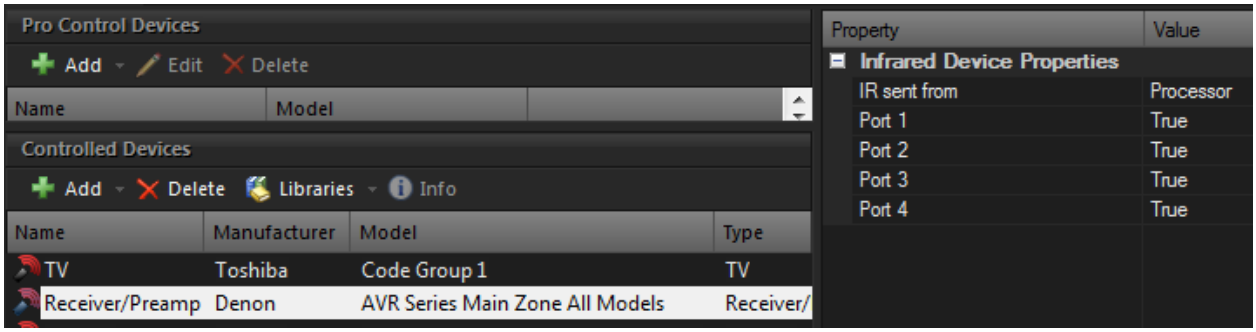
In some applications, it will be necessary to have some Controlled Devices receive IR commands directly from the handheld controller, while other devices must be controlled by the processor, in the same Macro.

For example, the TV may be a rear-projection model that has no location for an IR emitter, and the A/V receiver and cable TV tuner are in a rack located elsewhere.

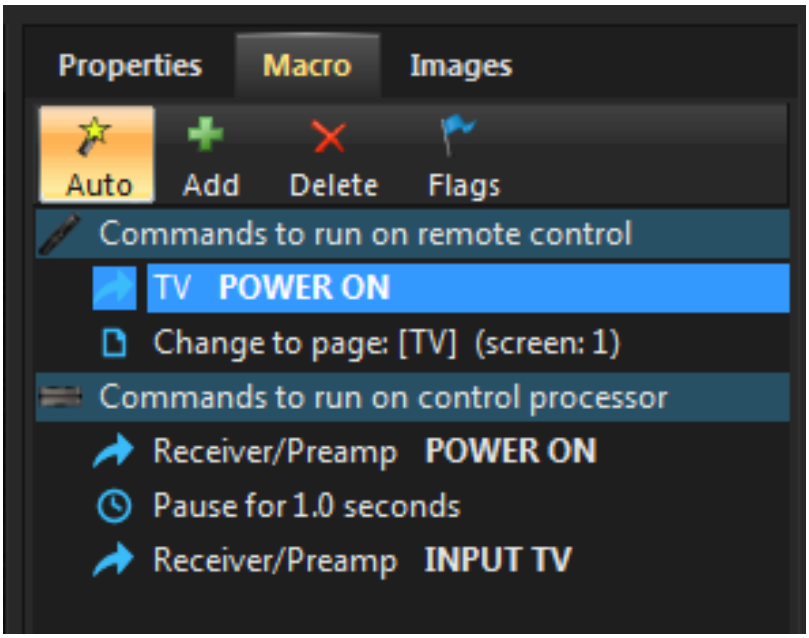
In the **Properties** of the Controlled Device requiring direct IR control from the remote, select "**Remote Control**" in the "**IR sent from**" field.



For the Controlled Devices connected to the processor, select "**Processor**" in the "**IR sent from**" field.



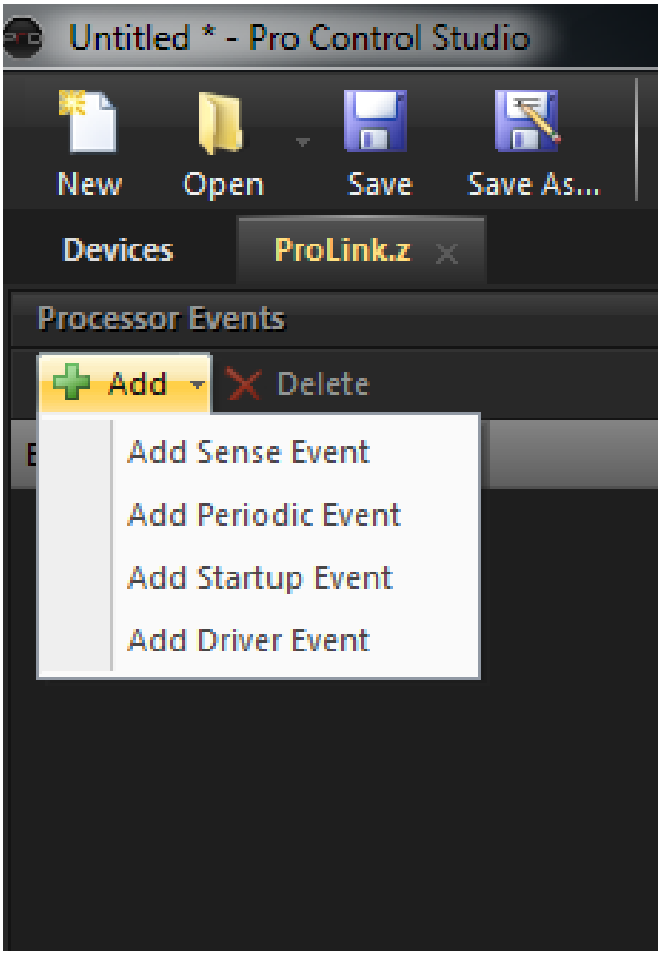
When the Macro is created, notice the TV's IR commands are running on the handheld controller, and the other functions are executed by the processor.



Processor Events

The ProLink processors are capable of executing "**Events**". Events are Macros, residing on the processor, which can be initiated by a **Power Sense** input, processor startup, Driver feedback, or a time condition. Events allow the programmer to "tie" functionality to occurrences within the system, such as a door opening, a Driver controlled device powering up or changing inputs, or time of day/sunrise/sunset/interval parameters.

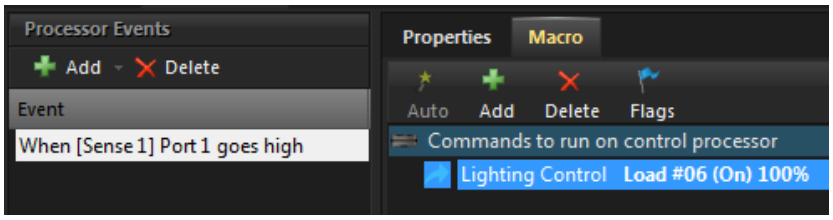
Events are accessed from the **Pro Control Devices** section of Pro Control Studio by selecting the "**Edit**" button while the processor is highlighted. Select "**Add**" to create an **Event**. Once the **Event** type is selected, create a Macro to be executed by the Event.



Sense Event

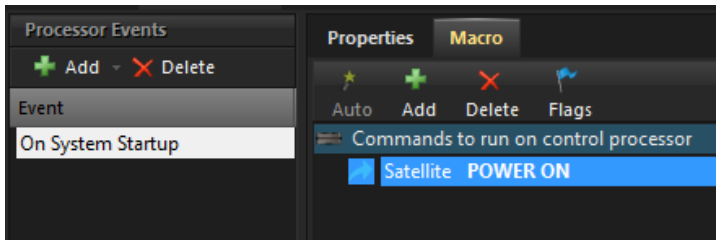
A **Sense Event** issues a Macro from the processor if a Power Sense input "**Goes High**" (sees voltage) or "**Goes Low**" (voltage is removed).

In this example, the processor will issue a command to a Lighting control system based on a Sense input, as may occur from a garage door switch or a motion detector.



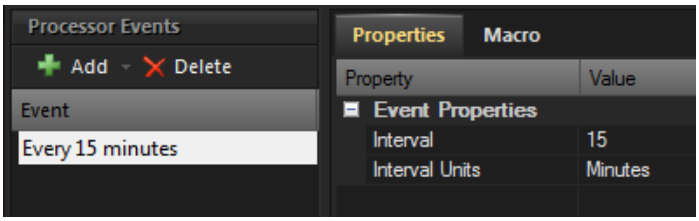
Startup Event

ProLink processors can issue a Macro when powered on, reset, or a program download is performed. Only one **Startup Event** is allowed, however the Startup Event Macro may contain as many steps as is necessary. For example, the processor may issue a Macro that will re-boot a satellite receiver, if power to the system is lost.

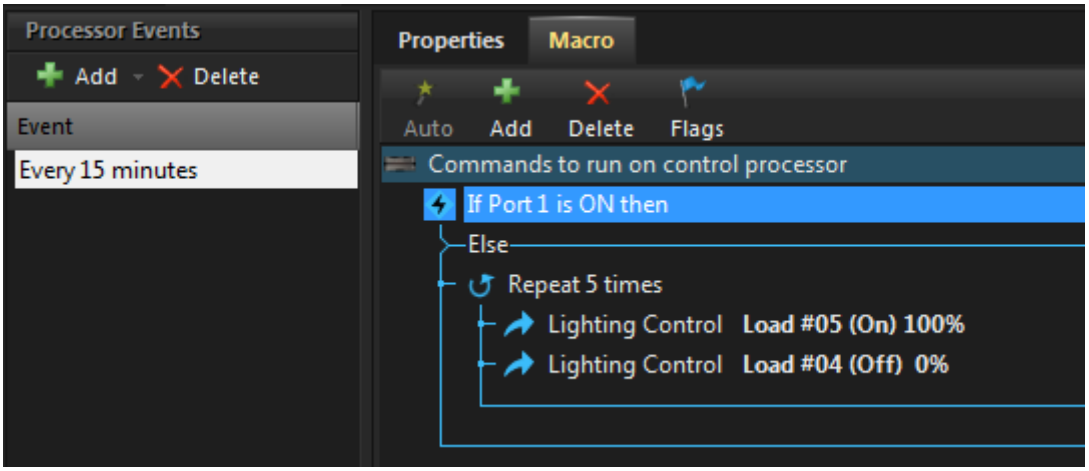


Periodic Event (ProLink.z only)

A **Periodic Event** is a specific Macro that runs on regular time intervals, between 1 second and 360 minutes.

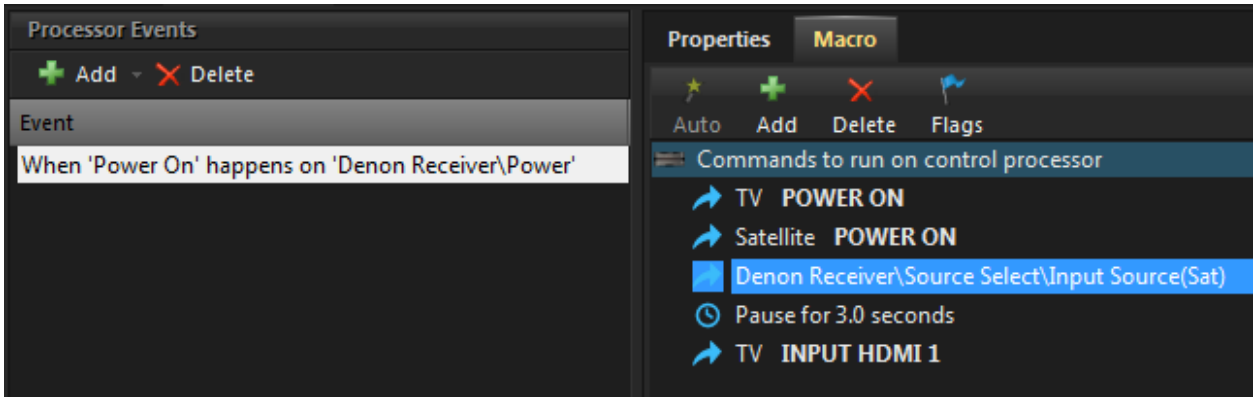


The example **Periodic Event** triggers a Macro that flashes a controlled lighting load 5 times if a garage door sensor is open. It checks the status of the door contact every 15 minutes.



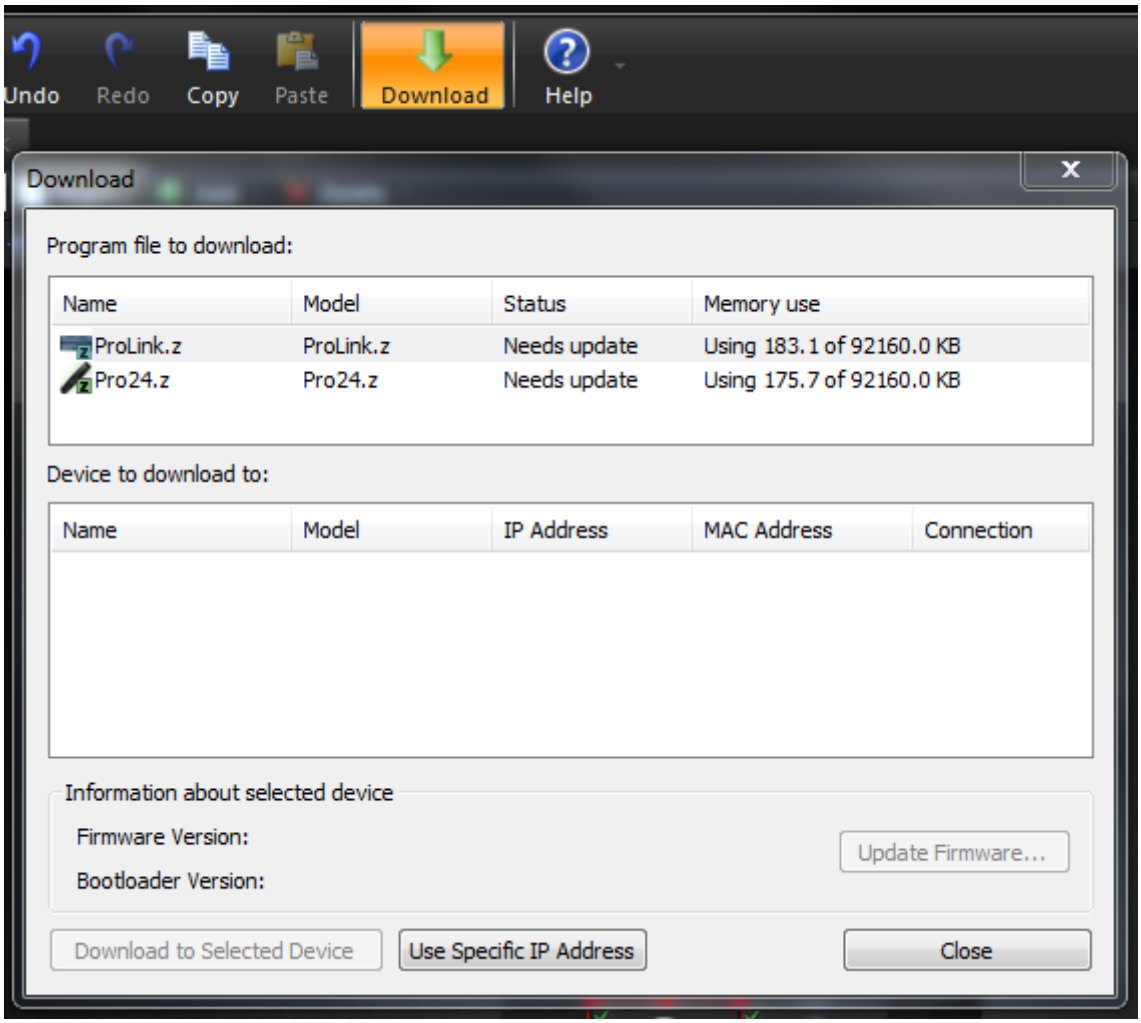
Driver Event (ProLink.z only)

A Driver Event executes a Macro when a Driver reports a specific Variable. In the example, if the A/V receiver is turned on, the TV and Satellite TV tuner turn on, and the A/V receiver and TV select the proper input.



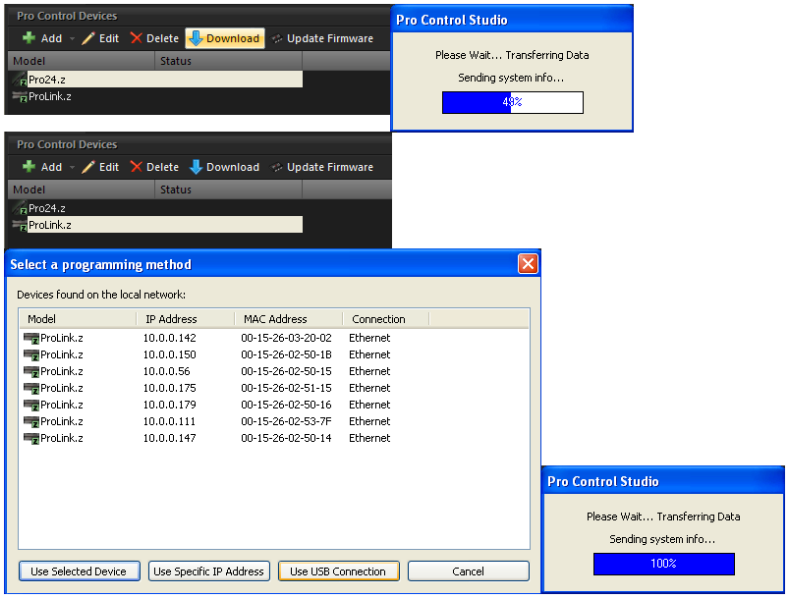
8. Downloading

When programming is complete, select the "**Download**" button from the top toolbar in Pro Control Studio.

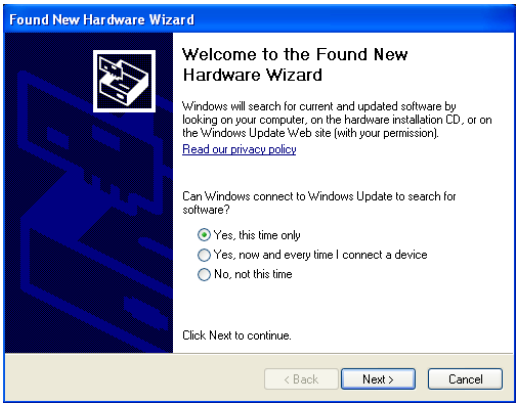


Plug the programming cable into both the remote and processor (one at a time), and click the "**Download**" button when the appropriate device is in reference.

When downloading to the processor, a "**Select a programming method**" window will appear. If Ethernet is connected to the processor it will show up in the list by MAC and IP address, and the programmer may download to it that way. If an Ethernet connection is not available, choose the "**Use USB Connection**" button and download via the provided programming cable.



When downloading, a "**Found New Hardware Wizard**" window may appear. Select the toggle for "**Yes, this time only**" and click "**Next**". Accept defaults that the wizard assigns and keep clicking the "**Next**" button. The necessary drivers are already on the computer and the Wizard will find and apply them.



Appendix A: Installing Pro Control Studio

Pro Control Studio is available exclusively to registered dealers. The software may be downloaded from www.procontrol.com. To become a registered dealer, please click the "**Register**" button at the top of the screen. Complete the online form with required information.

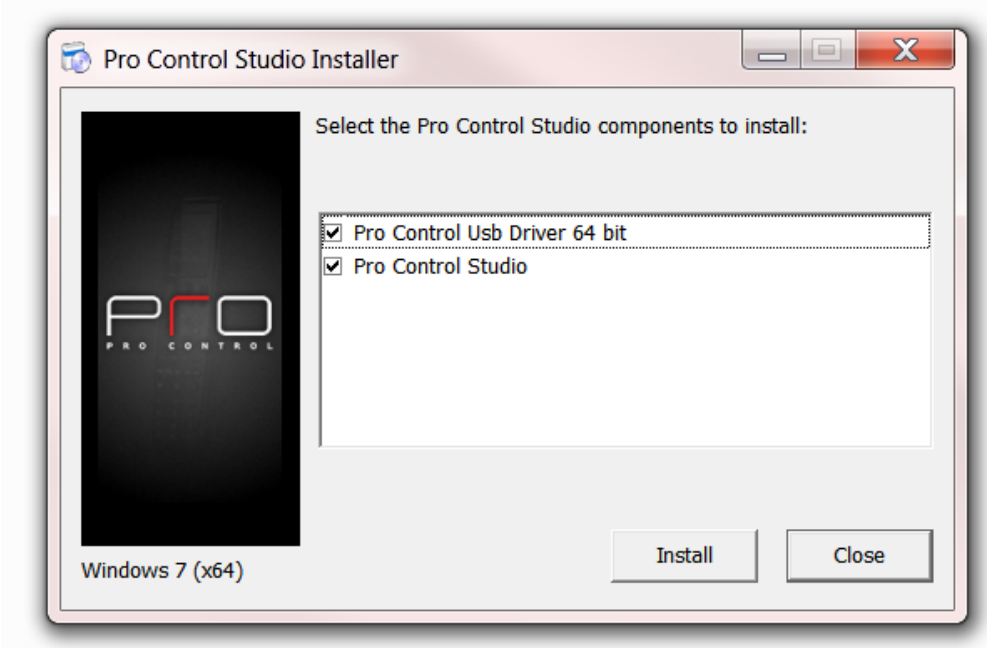
Once registered, your account will be verified through your distributor and access to the dealer portion of the website will be available upon login. A confirmation email will be sent upon approval.

Locate the "**Downloads**" tab. This will contain downloads including Pro Control Studio, firmware updates, and drivers.

Select the Pro Control Studio download link. This will open a download screen for the .EXE installer. Download the setup file to the desired location. The installation file may be deleted after Pro Control Studio is installed.

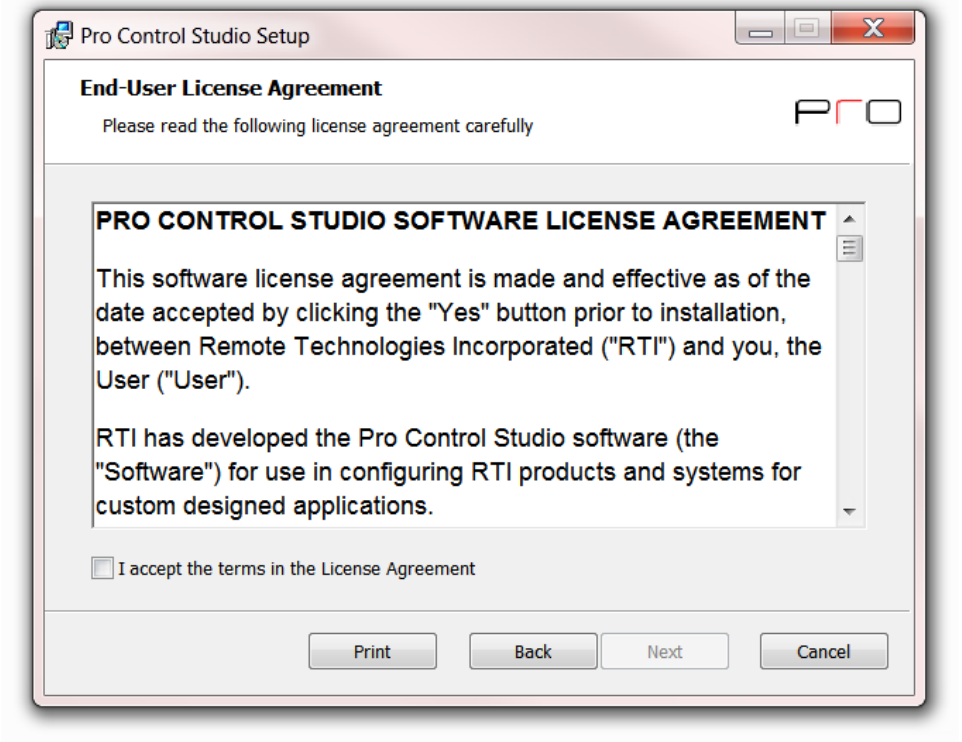
Navigate to the file location and open the .EXE and run. Windows may warn about potential risk in installing software or notify that the .EXE is going to make changes to your computer. Click "**Continue**" or "**Yes**" to proceed.

Choose to install Pro Control Studio and USB drivers and click the "**Install**" button.

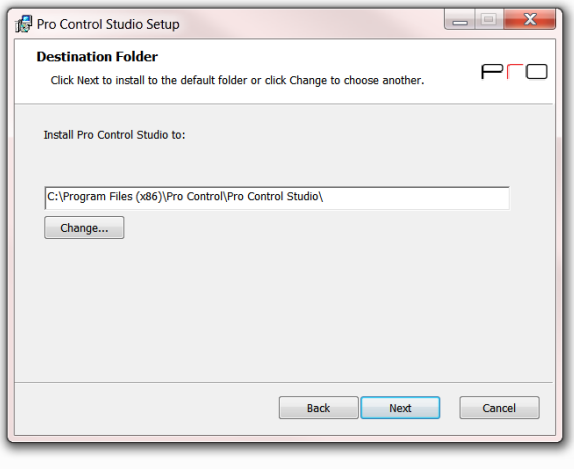


Click “**Next**” to continue.

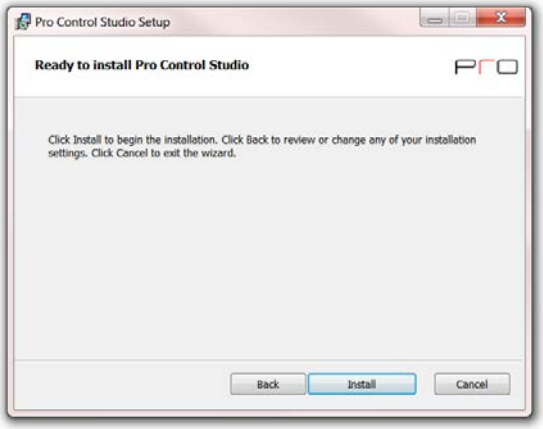
Please read the End User License Agreement and check the acceptance box. Select “**Next**” to continue.



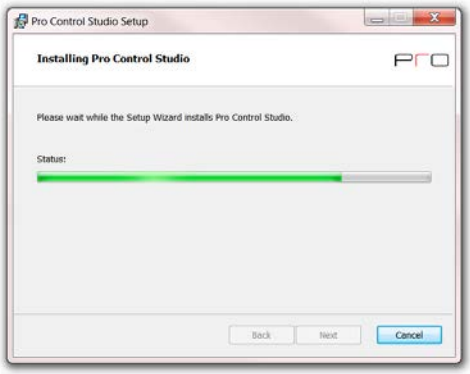
Choose a custom destination to install the program, or select “**Next**” to choose the default location (recommended).



Select “**Install**” to proceed, or “**Back**” to make changes.

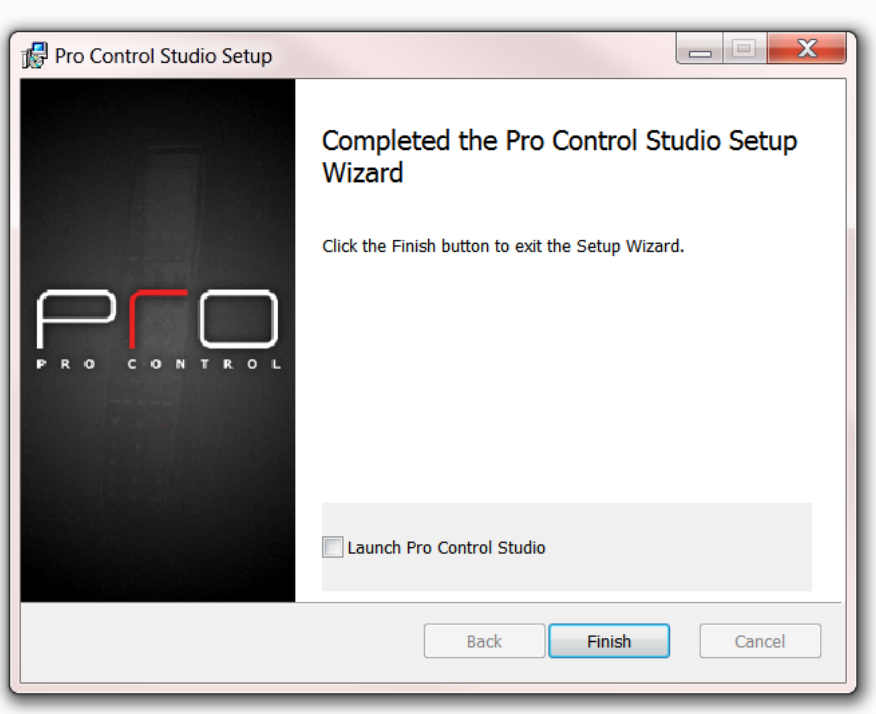


Installation will begin. This process may take several minutes depending upon your system performance.

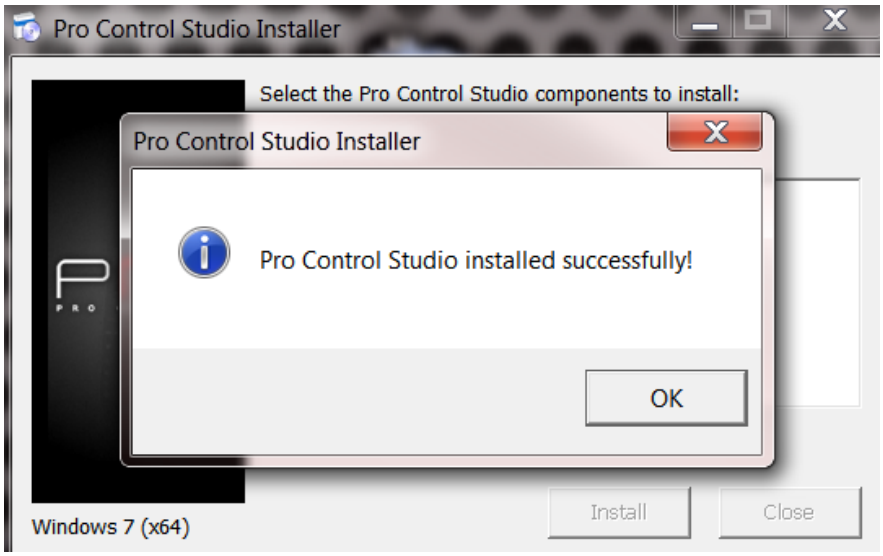


Select “**Finish**” to exit the setup.

PRO CONTROL



Pro Control Studio is now installed.



Appendix B: Learning IR Commands

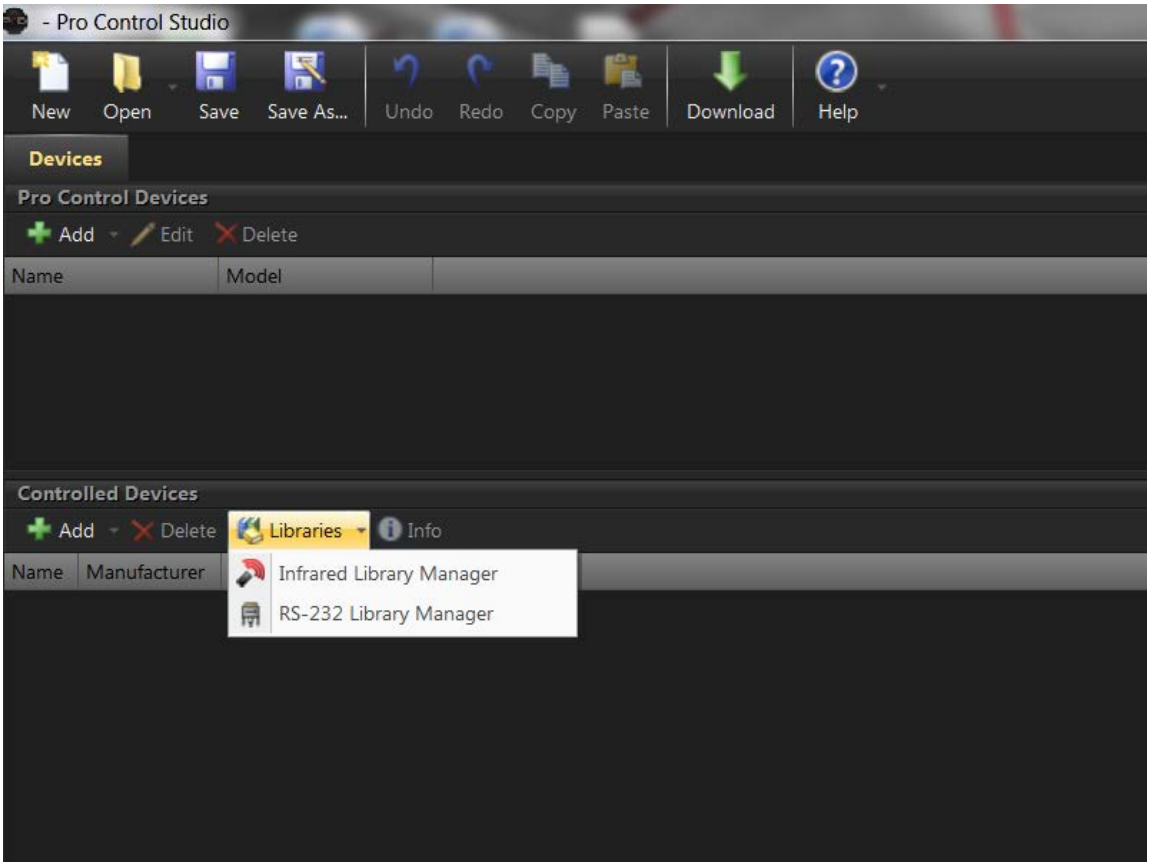
Learning IR Codes

On occasion, the programmer may be unable to find the proper code for a unique device or function. Pro Control Studio allows learning codes from other IR remote controllers.

In Pro Control Studio, locate the Controlled Devices area. From the "**Libraries**" menu, select "**IR Library Manager.**"

The **IR Library Manager** is a software program that is used to create or modify **IR Command Libraries**.

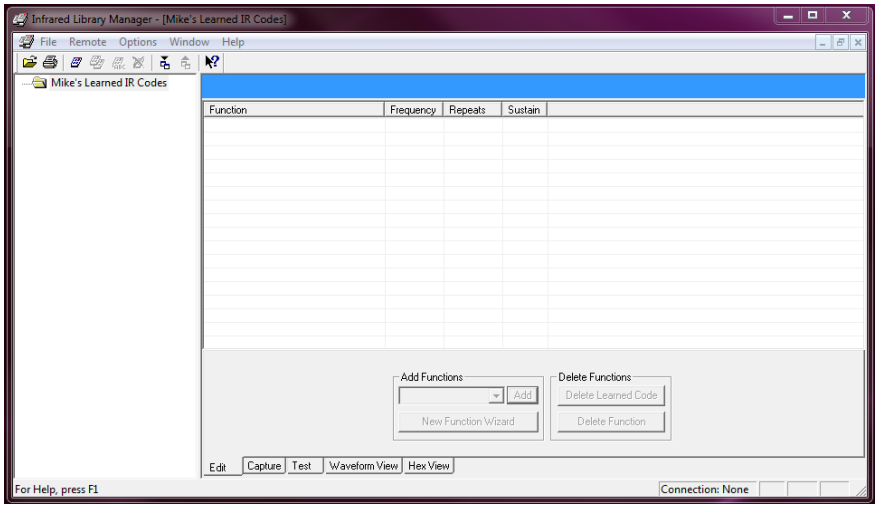
An "**IR Command Library**" is a collection of IR codes grouped into units called "**Remotes.**" IR Command Libraries store IR codes from remote controls that can be placed in Macros.



Step 1: Create Library

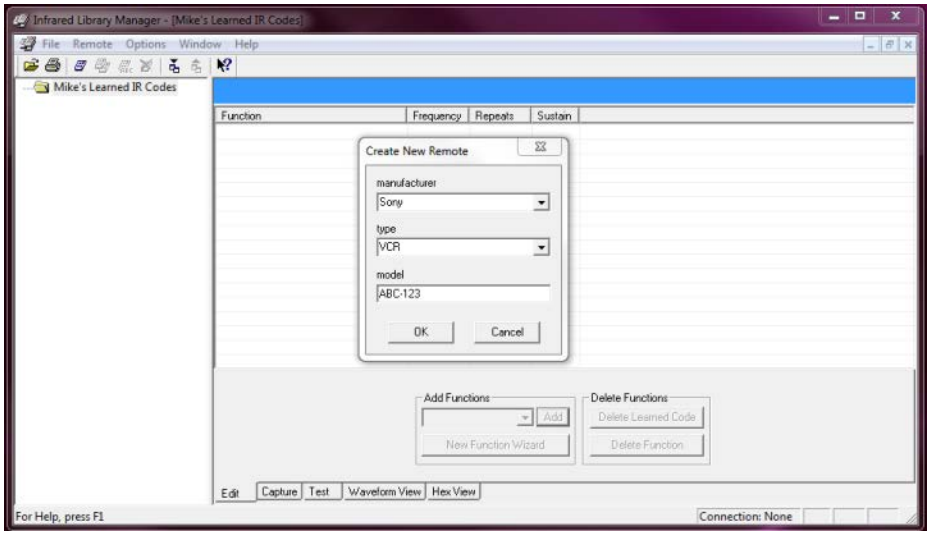
To create a new library, select **File>New**. Name the library as desired.

Codes may not be learned into the **Master IR Library**, as it is updated frequently and may cause the loss of learned codes.

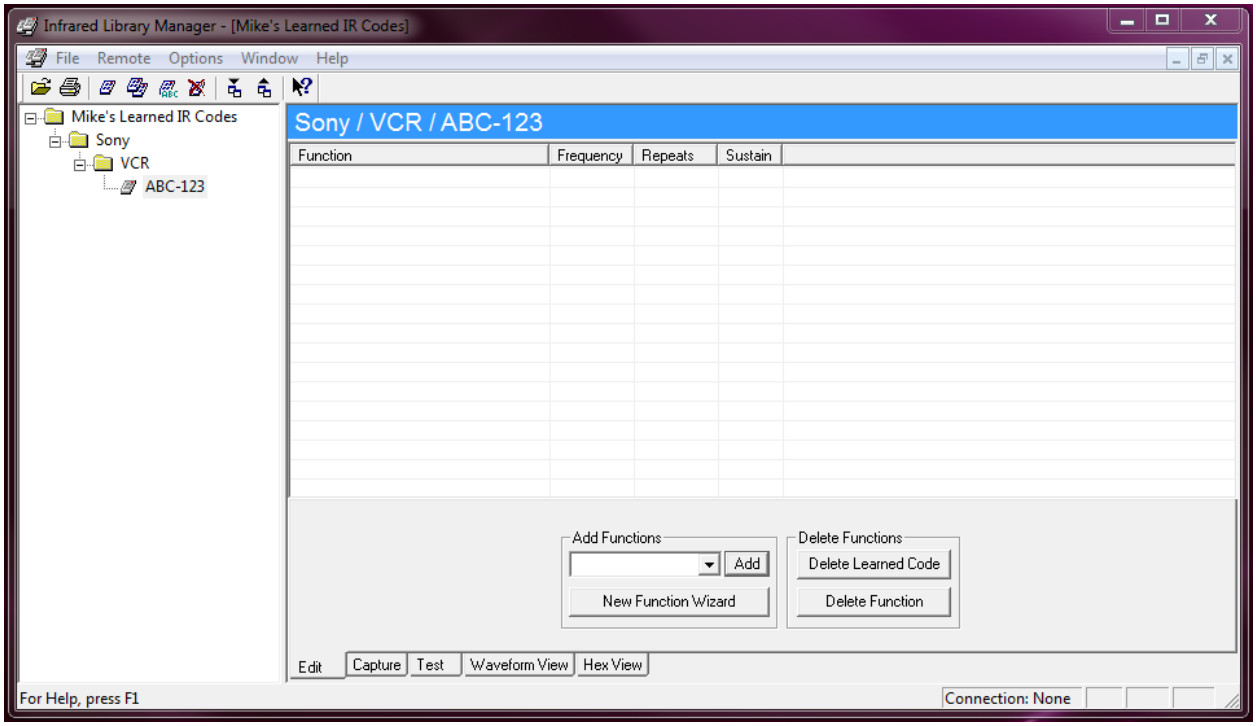


Step 2: Add the remote to be learned

Select **Remote>New**. Enter information for Manufacturer, Type of Device, and Model Number.



The device will be added to the newly-created IR Library.

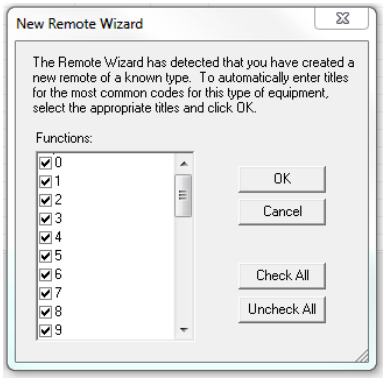


Step 3: Edit Functions

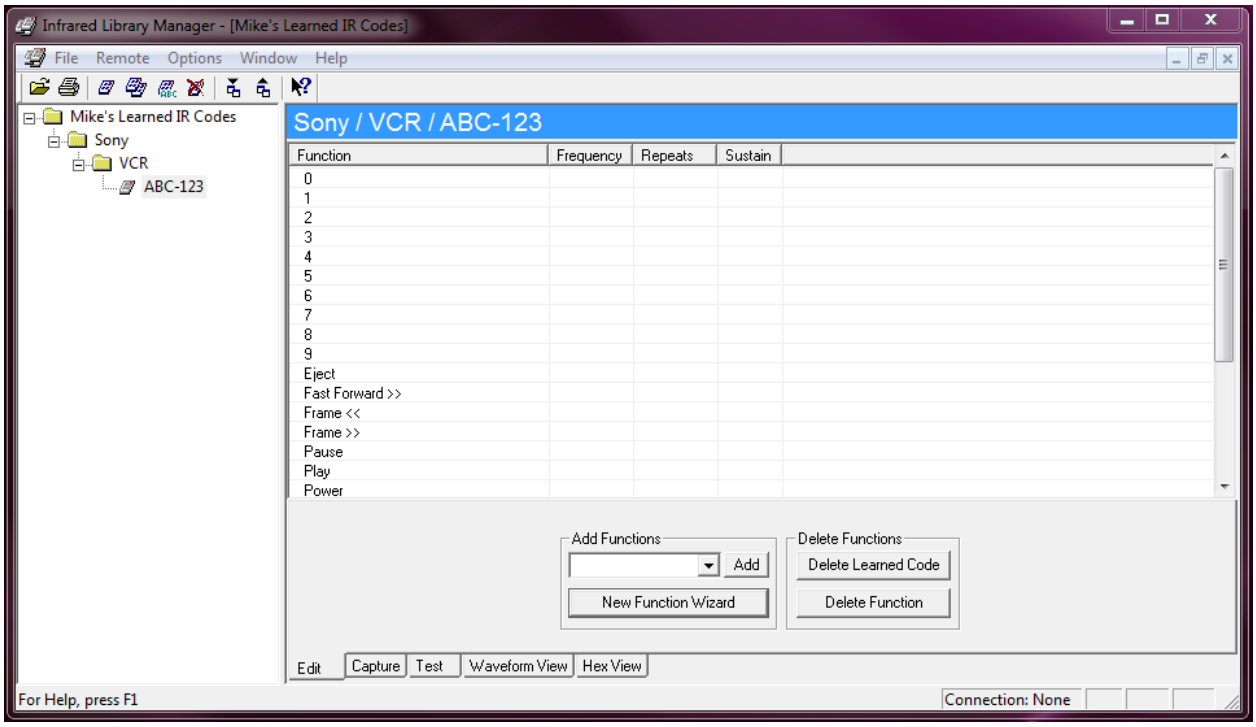
Functions are the IR commands to be learned from the "donor" remote controller. Functions may be added manually or by using the New Function Wizard.

New Function Wizard:

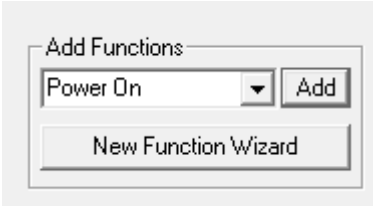
From the **Edit** tab, select the "**New Function Wizard**" button.



If the Wizard recognizes the device type entered in the previous step, a window will appear showing the commonly used functions for the device type. Select the desired functions from the scrolling list. The chosen functions will be added to the **Function** column of the **IR Library Manager**.



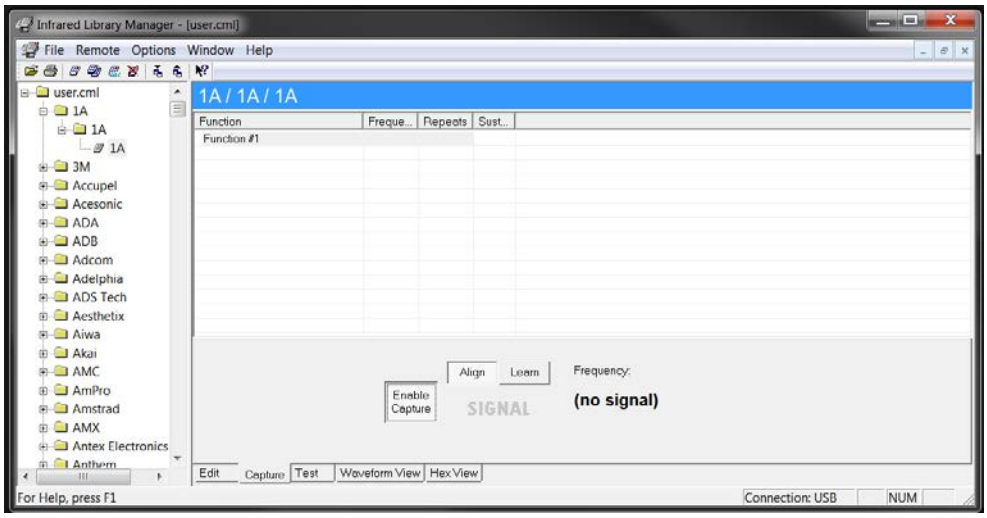
To manually add functions, type the desired function name under "**Add Functions**", or select a function from the pull-down list.



The manually added function(s) will appear in the **Function** column in alphabetical order. Functions may be deleted, using the "**Delete Function**" button.

Step 4: Capture IR Codes

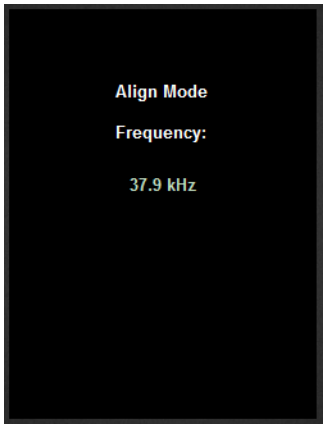
Connect the Pro Control remote into the computer via the programming cable (provided). Select the **Capture** tab from the bottom of the IR Library Manager.



Align the Remote

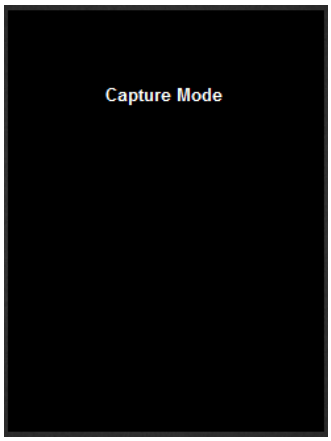
Press the "**Align**" button in the IR Library Manager. Place the Pro Control remote in close proximity to the "donor" remote controller (+/- 1 foot). Press and **HOLD** any button on the "donor" remote controller while aiming at the top (screen end) of the Pro Control remote.

As the Pro Control remote receives an IR signal, the carrier frequency will be displayed on the Pro Control remote's screen. If no frequency information is displayed, reposition the remotes and see the Troubleshooting section for more assistance.



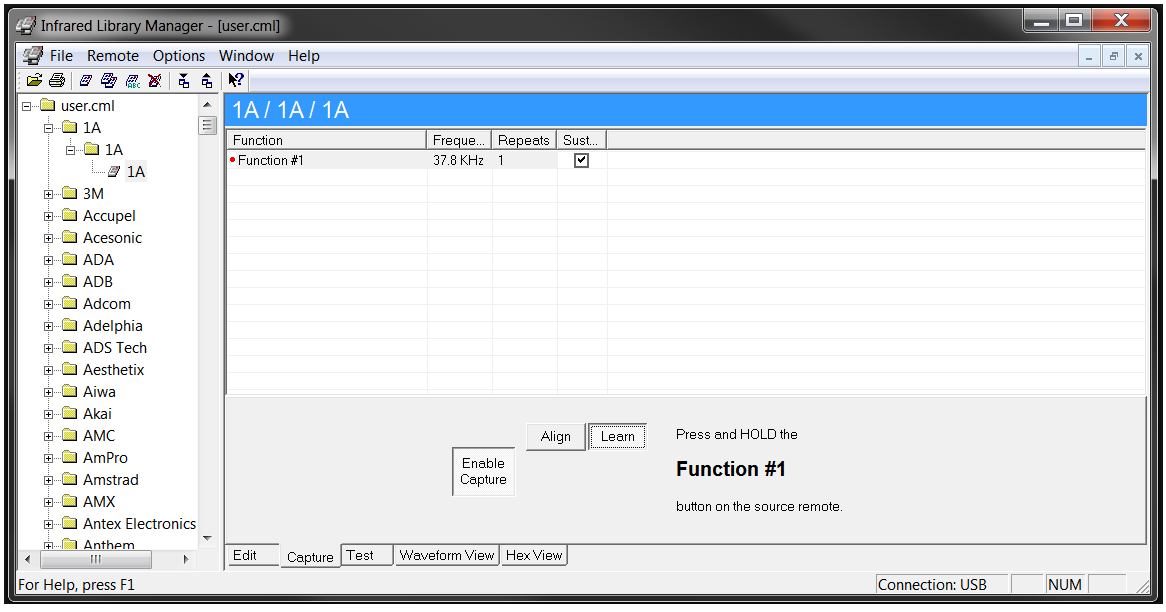
Learn IR Commands

Without moving the remotes, select the **"Learn"** button in the IR Library Manager. The Pro Control remote will now enter **Capture Mode**.



The IR Library Manager will automatically highlight the first function in the current library without an associated IR code. If you want to learn a different function, select it from the function list.

Press and **HOLD** the requested function (e.g. "Play") until the Infrared Library Manager learns the code and moves on to the next code. When a command is learned, a red dot will appear next to the Function name. The carrier frequency and repeats will have data.



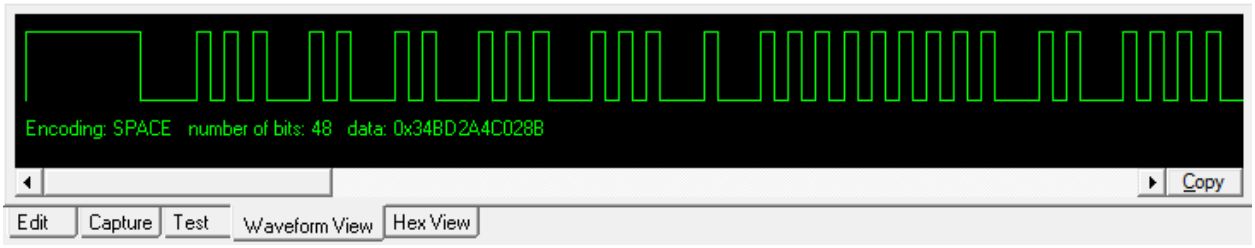
The IR Library Manager will automatically highlight the next listed function. Continue to learn all functions listed in the manner prescribed above.

When finished, navigate to **File>Save**. The default location is recommended.

Viewing IR Codes

Waveform

The **Waveform** tab allows the programmer to see a "picture" of the currently selected IR code.



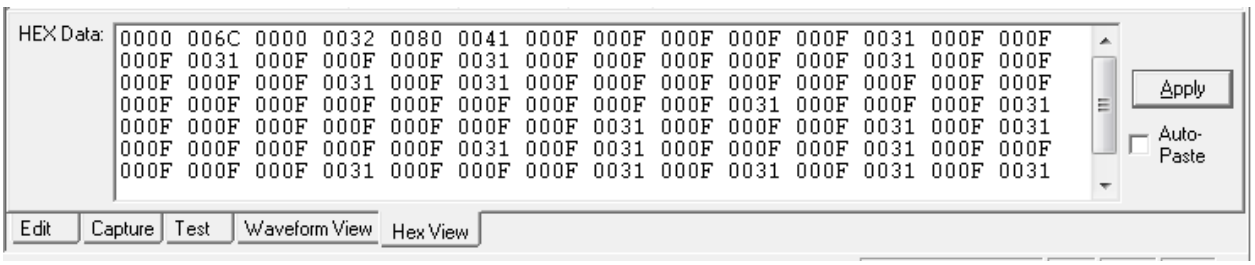
Yellow Waveform: This portion of the code is sent once.

Green Waveform: This portion of the code is repeated.

Red Waveform: This represents a portion of the IR code that is very long and condensed for display.

Hex

The **Hex View** tab allows you to import, export, and edit codes in the fully learned Hex format (those that start with 0000.) All other codes must be converted to this format first.



To use Hex View

1. Select a function in the function list. If there is already an Infrared code associated with that function, it will be converted to Hex format and displayed in the "**HEX Data**" field. If you select a function that does not have an Infrared code, the "**HEX Data**" box will be empty.

2. Type in the Hex data for the code, or copy it from an external program (such as a web browser), and then right-click in the "**HEX Data**" box and choose "**Paste**" from the menu.

3. Select **Apply** to update the Infrared code in the library

If you are converting a large number of codes, you can use the "**Auto-Paste**" feature to save time.

To use the Auto-Paste function

1. Click on the **Edit** tab and add the names of functions you have hex codes for.

2. Select the **Hex View** tab and check the "**Auto-Paste**" box.

3. Switch over to the application containing the hex data for the currently selected code. In that application, select and copy the hex data to the clipboard.

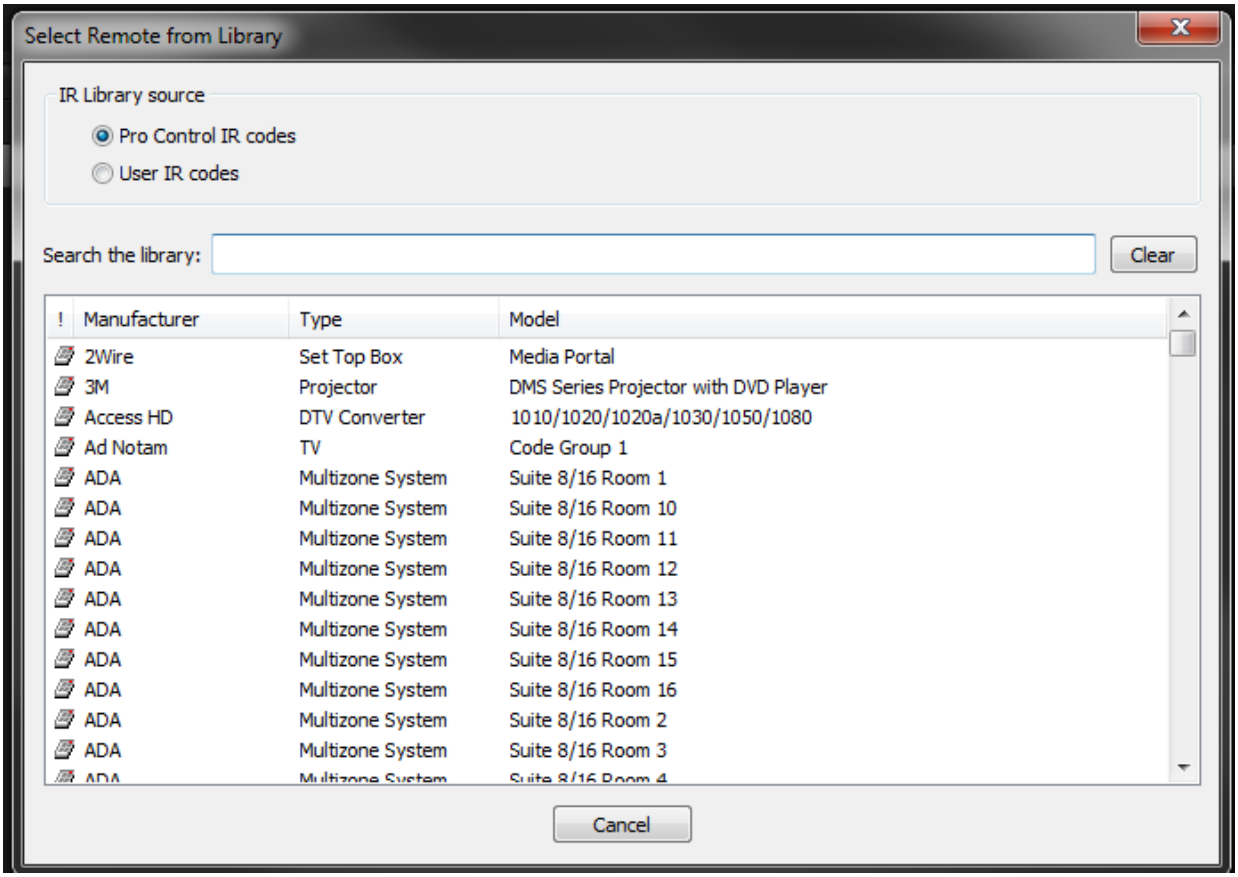
4. The IR Library Manager will automatically see the data being copied and paste it to the currently selected function. It will then automatically move to the next function, ready to copy the next function's data.

5. Repeat step 3 until all of the codes have been added.

Note: Not all codes in the library can be represented in Hex format. If you try to view a code that cannot be represented in Hex, you will see **"<<this code is not represented in HEX format>>"** in the **Hex Data** field.

Using Learned Codes

Under **Controlled Devices**, select **Add> Infrared Device**. Choose "**User IR Codes**" and select the appropriate IR Library. Locate and select the learned IR device.



IR Learning Troubleshooting

1. Make sure you hold down the button on the donor remote until the code capture process is complete as indicated on the computer screen.

2. Always place the Pro Control remote and the donor remote control on a flat surface. You may find it necessary to elevate the donor or the capture unit with a book or similar object to align them horizontally.

3. Once you have learned and tested a code from a remote, try not to move it until you have learned all the codes. If you do accidentally move either remote, you should re-align them.

4. It is **VERY IMPORTANT** to make sure the donor remote is using fresh batteries. The Pro Control remote needs a strong IR signal to properly learn a code. If the frequency read-out in the **ALIGN** mode is 0.0 kHz, then the code is a pulsed type. In this case, you should transmit the commands to the capture unit from as far away as you can without getting an error message.

5. If you always get an error message or trouble aligning when trying to learn a code, you should try moving the donor remote up and down or back and forth trying various angles and distances from the Pro Control remote. If this does not help, try tapping the buttons on the donor instead of holding them down.

6. Go into the **Repeat** column of the function and adjust the number of repeats. Some equipment may only work with 0 repeats while others may require as many as 4-5 and in extreme cases 7-8 or more. The number of repeats may also be adjusted in the button macro properties in Pro Control Studio as well as the Infrared Library Manager.

Appendix C: Adding Custom Color Graphics

In addition to the supplied templates of graphics that are included with Pro Control Studio, custom graphics may be added.

Compatible graphic formats include: .BMP, .GIF, .PNG, .JPEG, .TIFF, and .ICO.

.PNG is the preferred format, since it allows layers and transparency.

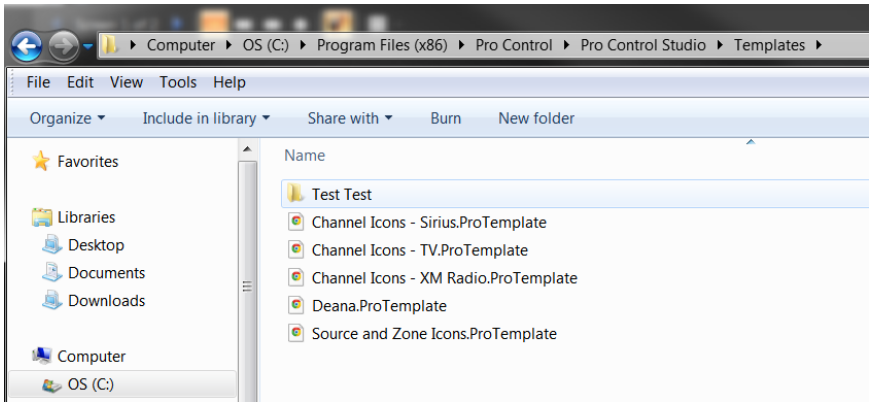
Common graphic sizes (in pixels):

26 x 26	Small Icons
36 x 36	Medium Icons
60 x 60	Large Icons
69 x 46	TV/Satellite Channel Icons
240 x 320	Background Images

Creating Graphics Library

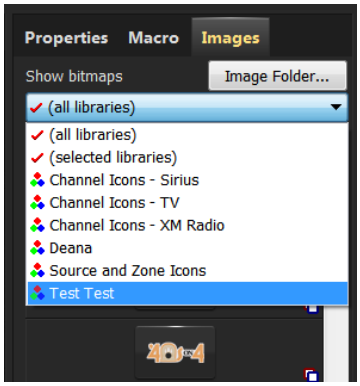
Navigate to the default directory for Pro Control Studio: **C:\Program Files(x86)\Pro Control\Templates**

Create a new folder, name as desired.



Place custom graphics in this new folder

The added graphics will appear as a new graphics library in the **Bitmap Library Browser**, identified by the name of the folder you have created.



The added graphics library will appear each time you open Pro Control Studio.

Note: If the new library does not appear, restart Pro Control Studio.

Graphic Designations

Pro Control Studio can identify a desired use for specific graphics, such as for a background or button, by the addition of a specific ending to a file name.

Background, Centered: ^#BGCENTER

Background, Tiled: ^#BGTILE

Button, Normal state: ^#UP

Button, Active state: ^#DOWN

Appendix D: Troubleshooting

General Troubleshooting

My remote will not turn on

When a handheld controller is powered on, a startup screen will be displayed (a few flashes of the screen which is normal). The Pro24.z requires a longer startup time than the Pro24.r, due to its larger memory. Handheld controllers will come preloaded with a demonstration program. The processors will have no file pre-loaded.

1. Verify the power switch is **ON**.
2. Verify the battery is correctly positioned. The printing on the battery should be visible, and an arrow pointing UP on the upper-right corner of the battery.
3. Contact Pro Control Technical Support:

   support@procontrol.com

   (952)224-5024

   Technical support hours, excluding holidays: 8:00am to 5:00pm Monday – Friday CST

My remote will not charge the battery

Pro Control recommends a 5-6 hour charge before continuous use. In order to charge a remote, the power switch must be in the **ON** position (see page 7).

A flashing red battery indicator at the bottom of the remote indicates the battery is still charging.

A solid red battery indicator indicates the battery is fully charged.

Charging the Pro24.r requires the use of a micro USB wall pack (provided). It may be charged with the supplied power adapter, or will charge while connected to a computer USB to micro USB cable (provided).

Charging the Pro24.z requires the use of a micro USB wall pack (provided). The cable may connect directly to the controller, or may be connected to the provided charging dock. The controller may be charged with the supplied power adapter, or will charge while connected to a computer USB to micro USB cable (provided).

1. Verify the power switch is **ON**.
2. Verify the battery is correctly positioned. The printing on the battery should be visible, and an arrow pointing UP on the upper-right corner of the battery.
3. Try a different charger, battery, and/or micro USB cable.
4. Contact Pro Control Technical Support:

   support@procontrol.com

   (952)224-5024

   Technical support hours, excluding holidays: 8:00am to 5:00pm Monday – Friday CST

My processor is not working

Verify that the processor is plugged in, using the correct power supply provided with the device.

Confirm that the AC outlet is functioning properly.

Confirm the power supply is using the correct adaptor for the country of use.

Verify that the Pro Control Studio system file has been loaded into the processor.

IR Command Troubleshooting

Check the IR Code's Waveform

Sometimes the waveform of the IR code can give some clues why they are not working.

Typically, codes with many red dashes or extremely long waveforms are signs the code is not good. This is simply a rule of thumb, however. Since most manufacturers use different IR code formats, it can be difficult to determine much by simply looking at a single waveform. It is usually more helpful if you have another code set for a similar device from the same manufacturer, or other codes within the same code set that **are working** to compare against.

Frequency

The carrier frequency used by a manufacturer is usually consistent between similar models. In most cases, minor differences in frequency (1 KHz or less) will not make a difference. However, while testing it may be helpful to try adjusting the carrier frequency in small increments.

Repeats

Enter in this box the number of times that the repeating part of the IR code is sent by the remote. By default an IR code programmed on a button will have 1 or more repeats. This is an insurance measure and most devices being controlled will interpret this as a single button press. However, some devices need a code to be repeated a certain number of times to work properly, and some may not work properly if the code is repeated at all. Change this setting only if you are having trouble with a code. If the codes are double hitting or are intermittent, this setting may help in that case also.

Sustain

Check this box to control whether or not the IR code should repeat if the button is held down. Most infrared codes will transmit continuously as long as the button is held down, but some infrared receivers may not work properly if the command is repeated at all. If the **Sustain** button is not checked, the code will be transmitted only the Minimum Repeat number of time, regardless of how long the button is held down.

Adjust the IR Output Gain

If using a processor, use a screwdriver to adjust the output gain. You may need to adjust the gain higher if multiple IR emitters are plugged in.

Try Different IR Codes

Try some different codes from the Pro Control IR command library from similar models by the same manufacturer. If the IR library does not list your specific model of a device, in many cases manufacturers will use the same IR code sets for many models.

Check the Positioning of any attached IR Emitters