

CalMAN Client for SCRATCH Quick Start Guide

CalMAN Display Calibration Software interfaces directly with ASSIMILATE SCRATCH software through the CalMAN Client for SCRATCH plugin. The plugin, available for both OSX and Windows, automatically produces the required test patterns (patches) as CalMAN measures one of the SCRATCH displays.

CalMAN controls the Client plugin as it creates an optimized calibration LUT file for the SCRATCH Interface monitor or dual head RGB monitor driven through the standard graphics adapter (or the laptop screen) and/or for an SDI video display driven through an SDI video output device (i.e. AJA, DeckLink, Bluefish, or Quadro).

The calibration LUT file(s) is then available to be loaded into ASSIMILATE SCRATCH to apply calibration correction to the selected display. SCRATCH alters its output signal, according to the LUT data, to correct the display performance to very accurately comply with the selected video standard (e.g. Rec709, DCI, etc.).

Required ASSIMILATE SCRATCH Software Version:

- Version 8.1 or later

Required CalMAN Software Version:

- Version 5.4.0 or later

Required CalMAN Workflow:

- Color Cube (3D LUT) workflow

Software Installation

CalMAN Client for SCRATCH Installation

Installing the CalMAN Client plugin into ASSIMILATE SCRATCH is a simple matter of copying the supplied CalMAN Client plugin file and icon file into the appropriate SCRATCH application folder.

With SCRATCH running on OSX:

Copy the CalMANpatOSX.spa plugin file and the CalMANpatOSX.tif icon file into the SCRATCH 'Plugins' folder, in the following directory path:

Macintosh HD/Library/Application Support/Assimilator/Plugins

With SCRATCH running on Windows:

Create a 'CalMAN' folder in the 'C:\Program Files \Assimilate\Plugin64' directory.

Copy the CalMANpatWin.spa plugin file and the CalMANpatWin.tif icon file into the 'CalMAN' folder.

The final directory path should be: C:\Program Files\Assimilate\Plugin64\CalMAN\ CalMANpatWin.spa

Visual Studio 2013 Redistributable Installation

If SCRATCH is installed on a Windows operating system earlier than version 8.1, you will also need to install the following Windows software package.

Visual C++ Redistributable Visual Studio 2013

<http://www.microsoft.com/en-us/download/details.aspx?id=40784>

SCRATCH CustomCommands.xml

SCRATCH allows you to add a 'CalMAN Client' button to the SCRATCH interface to automatically launch the CalMAN Client plugin, rather than having to manually initialize the plugin. The SCRATCH commands to set up the custom button are contained in a CustomCommands.xml file.

If SCRATCH doesn't already have a CustomCommands.xml file in the following directory, copy the supplied CustomCommands.xml file to the directory:

With SCRATCH running on OSX:

Macintosh HD/Library/Application Support/Assimilator/Settings

With SCRATCH running on Windows:

C:\ProgramData\Assimilator\Settings

If SCRATCH already has a CustomCommands.xml file in the above directory, you can either edit the existing xml file with a text editor such as Notepad.exe or TextEdit, or, you can set up the custom plugin command through the SCRATCH menus. See Appendix A at the end of this document for details.

CalMAN Installation Configurations

The main CalMAN Display Calibration Software can be installed in a number of different configurations to control the test pattern output from the CalMAN Client plugin. These possible CalMAN configurations are described below, starting with whether ASSIMILATE SCRATCH is running on OSX or Windows.

With SCRATCH running on OSX:

1. CalMAN can be installed on the same OSX computer that SCRATCH is running on, running in a VMware Fusion* virtual Windows machine.
2. CalMAN can be installed on a separate Windows computer.
3. CalMAN can be installed on a separate OSX computer, running in a VMware Fusion virtual Windows machine or under Boot Camp with Windows.

** CalMAN can also run on a Mac in a Parallels virtual Windows machine, but due to occasional USB device driver issues with Parallels, it is not currently recommended.*

With SCRATCH running on Windows:

1. CalMAN can be installed on the same Windows computer that SCRATCH is running on.
2. CalMAN can be installed on a separate Windows computer.
3. CalMAN can be installed on a separate OSX computer, running in a VMware Fusion virtual Windows machine or under Boot Camp with Windows.

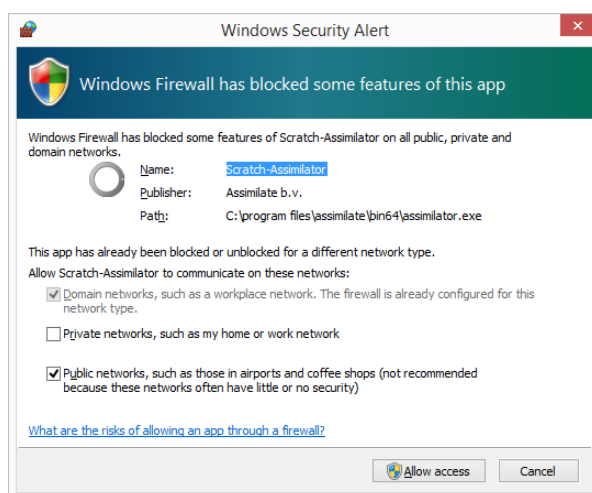
In each of the above installation configurations, CalMAN will connect to SCRATCH over TCP/IP to control the CalMAN Client plugin.

Firewall Security

The first time that you run SCRATCH with the CalMAN Client plugin installed, the plugin will attempt to communicate over the network.

With SCRATCH installed on Windows:

Windows will display a Security Alert dialog (below) stating that it has blocked network communication. Check the appropriate boxes on the alert dialog and click the *Allow Access* button.



With SCRATCH installed on OSX:

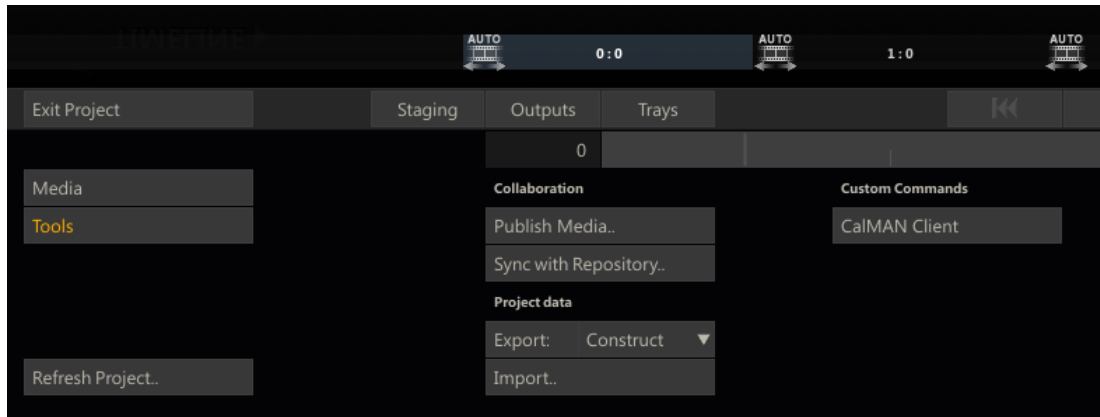
To allow incoming connections through an active Mac firewall:

System Preferences / Security & Privacy / Firewall / Advanced / Automatically allow signed software to receive incoming connections

Software Setup

Open SCRATCH with CalMAN Client plugin

1. Open SCRATCH.
2. Enter your project.
3. At the lower left of the SCRATCH screen, select 'Tools.'
4. At the lower center, under Custom Commands, select 'CalMAN Client.'



Open CalMAN Color Cube workflow

1. Open CalMAN.
2. Load the Color Cube workflow. In the CalMAN main menu, select 'Open Workflow Template' / 'Color Cube (3D LUT).'

Display Calibration

Follow this procedure to:

- Create a display calibration 3D LUT file for an RGB interface monitor, a dual head RGB output monitor, and/or a dual head SDI video display driven from ASSIMILATE SCRATCH.
- Load the 3D LUT file(s) into ASSIMILATE SCRATCH.
- Verify the calibrated display performance.

Create Display Calibration 3D LUT

Proceed through each step of the Color Cube workflow in the normal fashion, using the following notes for ASSIMILATE SCRATCH specifics.

1. Initial Setup section

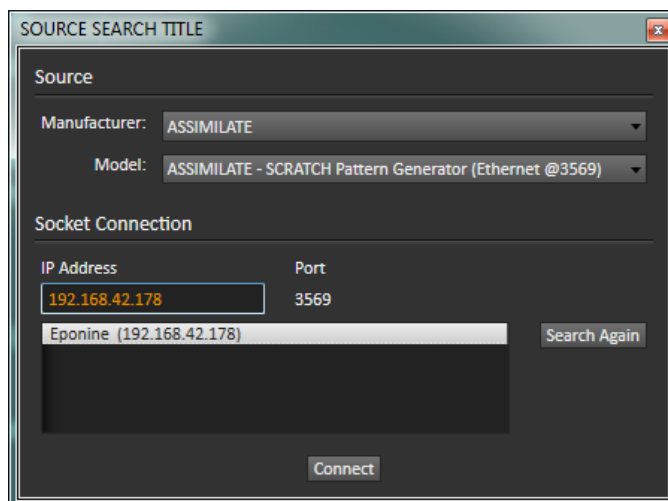
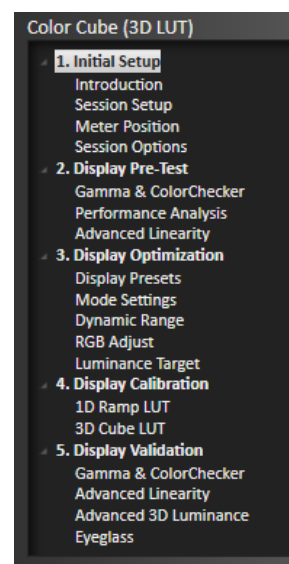
In the 'Initial Setup' section of the Color Cube workflow, step through the following pages:

a. Session Setup - Meter Connect

- Connect your color meter to the CalMAN computer.
- On the *Session Setup* page, click the *Find Meter* button.
- If your meter is listed on the *Find Meters* dialog, select it, then click *Search*. If your meter is not listed on the dialog, just click *Search*.
- Position the meter on the target monitor.

b. Session Setup - Source Connect

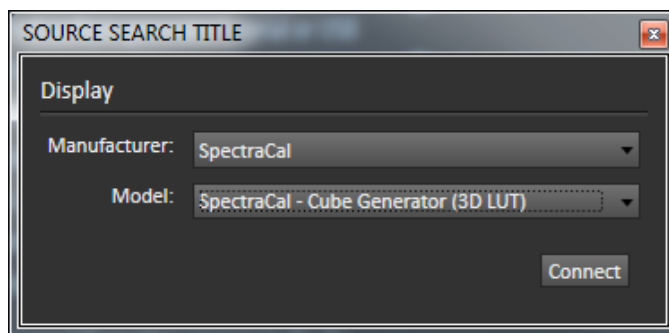
- On the CalMAN *Session Setup* page, click the *Find Source* button.
- On the *Source* dialog, under *Manufacturer*, select "ASSIMILATE."
- Under *Model*, select "ASSIMILATE – SCRATCH Pattern Generator."
- Select the IP address of the target computer to be calibrated.
- Click *Connect*.



c. Session Setup - LUT Device Setup

On the *Session Setup* page in the Color Cube workflow, click the *Find 3D LUT Device* button. Because you want to generate a standalone LUT file, you will use the *Cube Generator* device.

1. On the *Display* dialog, under *Manufacturer*, select “SpectraCal.”
2. Under *Model*, select “SpectraCal – Cube Generator (3D LUT).”
3. Click *Connect*.



d. Session Options

On the *Session Options* page in the Color Cube workflow, you need to select the *Input Signal Levels* to match the display you are calibrating and the selected SCRATCH format.

To calibrate the SCRATCH Interface RGB monitor or a dual head RGB output monitor, driven through the standard graphics adapter (or the laptop screen):

- For ‘Input Signal Levels,’ select ‘Full (0-1023).’

To calibrate an SDI video display, connected to SCRATCH through an SDI video output device (i.e. AJA, DeckLink, Bluefish, or Quadro):

- For ‘Input Signal Levels,’ select ‘SMPTE (64-940).’
- If, in SCRATCH, you selected one of the ‘Scaled’ formats (e.g. Rec709 Scaled), then in CalMAN, on the Source Settings tab, enable the ‘SDI Range – Scaled (SMPTE)’ setting (enabled by default).
- If you did not select one of the ‘Scaled’ formats, be sure to disable the CalMAN ‘SDI Range – Scaled (SMPTE)’ setting.

2. Display Pre-Test section

In the 'Display Pre-Test' section of the Color Cube workflow, you can measure the performance of a display before you calibrate it, on the *Gamma & ColorChecker* page and on the *Advanced Linearity* page.

NOTE: Be sure that you have selected the proper Luminance Levels in CalMAN (see the *Session Options* section, just above).

On the Performance Analysis page, the display measurements from the previous two pages are evaluated in a series of pass/fail performance parameters. If the display fails in any of these parameters, you should consider using the following *Display Optimization* section of the workflow to optimize control adjustments on the display itself.

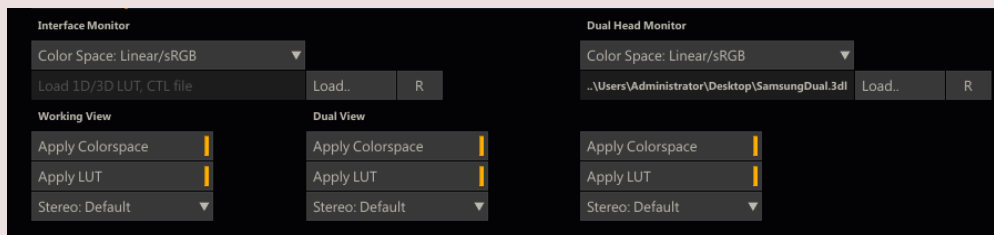
If the display passes all of these parameters, you can skip the *Display Optimization* section and go immediately to the *Display Calibration* section of the workflow.

CAUTION: Before you begin the following sections to optimize the display controls or perform 3D LUT calibration, be sure to remove any existing LUT that SCRATCH may be applying to the monitor to be calibrated.

Failure to remove a previous SCRATCH LUT before making any adjustments or creating a new LUT will result in an inaccurate display calibration.

To remove an existing SCRATCH LUT:

1. Right click on the SCRATCH project screen to display the SCRATCH menu and select *Settings*.
2. At the lower right of the screen, select *Monitor*.



3. For the target monitor, click the "R" button, to the right of the "Load" button, to remove any existing LUT.
4. Click the "Apply Colorspace" button to disable it.
5. Click the "Apply LUT" button to disable it.

3. Display Optimization section

In the *Display Optimization* section of the Color Cube workflow, you are guided to optimize any controls the display may have for picture mode, color gamut, color temp, gamma, dynamic range, white point balance, or white point luminance.

On the *RGB Adjust* page, if the display has RGB Gain controls, under the *Two Point Levels* selection, select “2 Point 30, 100%.” Click *Read Continuous* and adjust the monitor’s RGB Gain controls for RGB balance at 100%. Accurate RGB balance at 100% is beneficial as foundation for 3D LUT calibration.

4. Display Calibration section

In the *Display Calibration* section of the Color Cube workflow, there are provisions for calibrating both a 1D LUT (on the *1D Ramp LUT* page) and a 3D LUT (on the *3D Cube LUT* page).

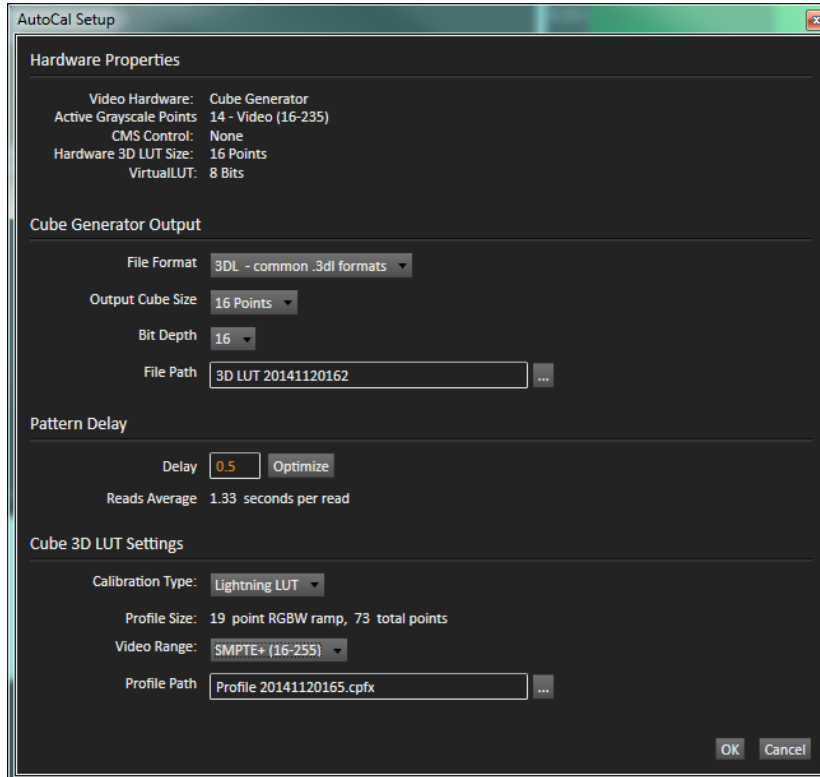
When we are using the CalMAN Cube Generator function to produce a 3D LUT file for SCRATCH, we will skip the 1D Ramp LUT (1D LUT) page and use only the 3D Cube LUT page.

a. **1D Ramp LUT page**

Skip over the 1D Ramp LUT page when using the CalMAN Cube Generator function to produce a calibration LUT file for ASSIMILATE SCRATCH.

b. **3D Cube LUT page**

1. On the 3D Cube LUT page, click the *AutoCal* (rotating arrows) button at the right end of the meter action buttons. The *AutoCal Setup* dialog then appears (see below).



2. Under *File Path*, select the desired directory path and provide a name for the LUT file that CalMAN will create (e.g. monitor ID and date).
3. Under *Calibration Type*, select the desired type of 3D LUT calibration process.
 - **IR Profile (time based)**: Creates the best quality display calibration 3D LUT possible in the selected period of time. You select how much display quality you have time for, from 30 minutes to maximum display quality (6,000 points max). Uses Intelligent Resolution Profiling to search out the most nonlinear color space areas and correct those first.
 - **IR Profile (point based)**: Creates the best quality display calibration 3D LUT possible with the selected number of measurement points (1,000 - 10,000 points). Uses Intelligent Resolution Profiling to search out the most nonlinear color space areas and correct those first.
 - **Lightning LUT**: Creates a display calibration 3D LUT in five minutes or less. Produces a very high quality result on professional displays with moderate linearity. Displays with significant nonlinearity may produce marginal results.
4. Under *Video Range*, select “SMPTE (16-235)” if you are calibrating an SDI video monitor and have selected one of the ‘Scaled’ formats in SCRATCH.
5. Click *OK*.

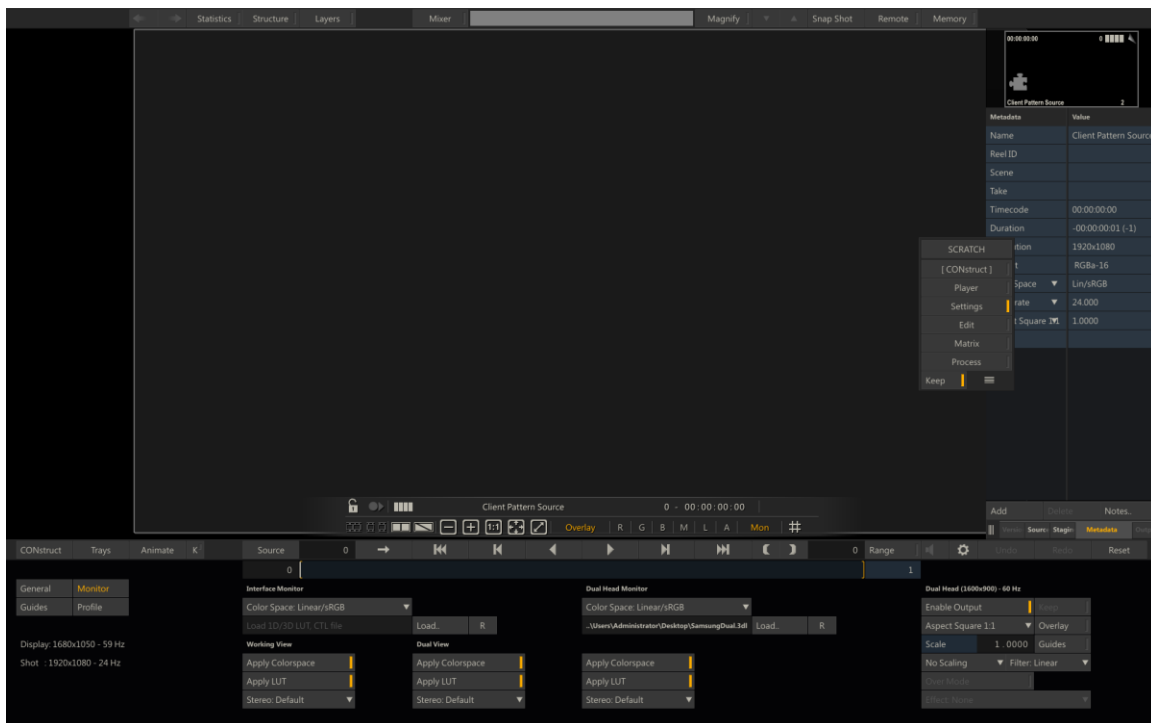
When the AutoCal process completes, you are ready to load the 3D LUT file that CalMAN created into ASSIMILATE SCRATCH (see below).

Load CalMAN LUT file into ASSIMILATE SCRATCH

Follow this procedure to load the 3D LUT you just created into ASSIMILATE SCRATCH, as a display calibration LUT.

To load the CalMAN 3D LUT into SCRATCH:

1. Right click on the SCRATCH project screen to display the SCRATCH menu and select *Settings*.
2. At the lower left of the screen, select *Monitor*.
3. For the target monitor, click the "Load" button, then navigate to the drive location where you specified the CalMAN LUT to be saved. If you did not specify a location, the default CalMAN LUT file location is: \Documents\SpectraCal\CalMAN 5 for Business\LUTs.
4. Select the LUT file to load it for the target monitor.
5. Click the "Apply Colorspace" button on the SCRATCH screen to enable it.
6. Click the "Apply LUT" button to enable or disable LUT correction.



NOTE: Each monitor requires its own 3D calibration LUT. SCRATCH can apply a separate LUT to its Interface monitor and to its Dual Head RGB or Dual Head SDI output monitor.

7. **Display Validation section**

In the *Display Validation* section of the Color Cube workflow, you can verify the accuracy of the resulting display calibration.

To validate the 3D LUT display calibration:

1. In SCRATCH, under *Settings / Monitor*, be sure that the *Apply LUT* button is enabled for the target monitor.
2. On the *CalMAN Validate Calibration* and/or on the *Advanced Linearity* page, click the *Read Series* button to make a complete series of validation measurements.
3. Observe the calibrated max and avg performance data.

To compare display performance with the 3D LUT bypassed:

1. On the *Gamma & ColorChecker* and/or on the *Advance Linearity* validation page, click the "+" to the right of the *History 1* tab, to create a new *History 2* data tab (right click a tab to rename it).
2. In SCRATCH, under *Settings / Monitor*, disable the *Apply LUT* button to bypass the display calibration LUT.
3. Click the *Read Series* button to make a complete series of validation measurements on the *History 2* tab.
4. Observe the uncalibrated max and avg performance data.
5. Compare to the calibrated performance data on the *History 1* tab.
6. Return the *Apply LUT* button to its enabled state.

On any of the *Display Validation* pages, click the *Save* button to save the measurement and 3D LUT data.

Appendix A

Editing an existing CustomCommands.xml file

SCRATCH allows you to add a 'CalMAN Client' button to the SCRATCH interface to automatically launch the CalMAN Client plugin, rather than having to manually initialize the plugin. The SCRATCH commands to set up the custom button are contained in a CustomCommands.xml file.

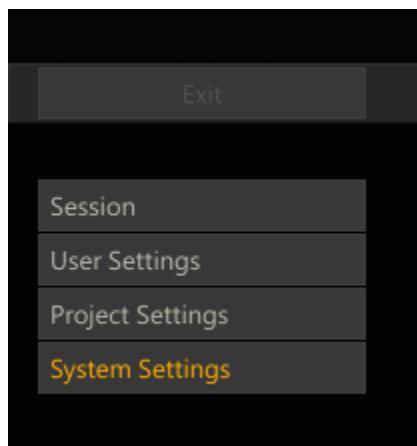
If SCRATCH already has a CustomCommands.xml file, as discussed in the *SCRATCH CustomCommands.xml* section, above:

You can either edit the existing xml file with a text editor such as Notepad.exe or TextEdit to add these lines to the end of the existing CustomCommands.xml file, just before the final `</scratch>` entry:

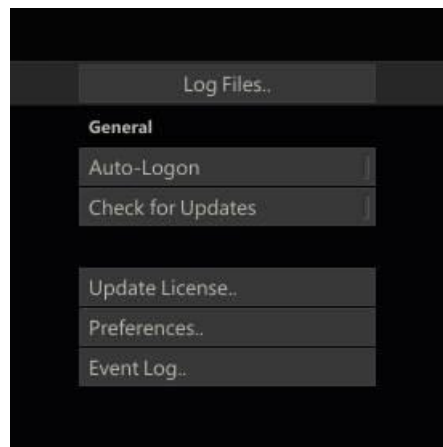
```
<command
  uuid="dd278702-1657-48e5-a4d4-0d6b5c5997a1"
  type="plugin"
  enter_player="Y"
  shot_selection="0">
  <title>
    CalMAN Client
  </title>
  <cmdline>
    AFC10569-8B45-40B4-A29D-086BDE130040
  </cmdline>
</command>
```

OR, you can set up the custom plugin command through the SCRATCH menus:

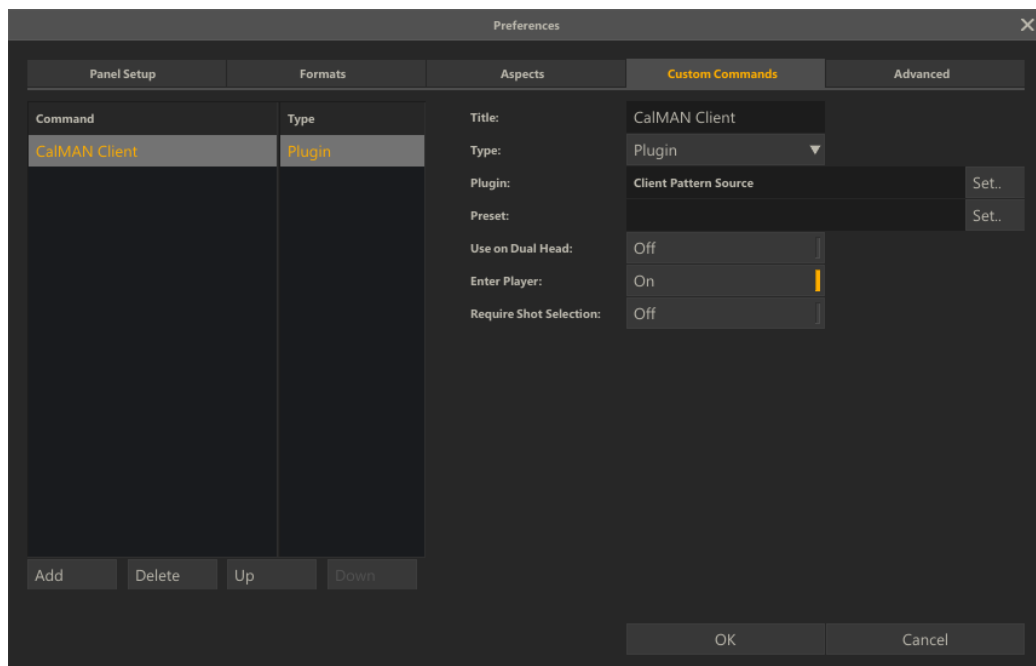
1. Select *System Settings*, at the bottom left of the main SCRATCH page.



2. Select *Preferences*, at the bottom right of the main SCRATCH page.



3. Select the *Custom Commands* tab on the Preferences window.
 - a. Click *Add* at the lower left to add a new command.
 - b. In the *Title* field, type 'CalMAN Client'.
 - c. In the *Plugin* field, click *Set* to link to the CalMAN Client plugin file (the plugin directory path is given in the Installation section, above).
 - d. Click the *Enter Player* field to enable it.
 - e. Click OK.



4. Enter your SCRATCH project.
5. Click on the *Tools* button at the bottom left.
6. Under Custom Commands, select CalMAN Client.

