

Crestron
Professional Surround Sound Tuning Kit
Operations Guide



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Contents

Professional Surround Sound Tuning Kit	1
Introduction	1
Setup	2
Supplied Hardware	2
Installation	2
Hardware Hookup	2
Operation	4
Initial Configuration	4
Room EQ setup	5
Measurement	6
Detection Results	9
Target Sound Options	10
Save Results	11
Problem Solving	15
Troubleshooting	15
Reference Documents	15
Further Inquiries	16
Future Updates	16
Software License Agreement	17
Return and Warranty Policies	19
Merchandise Returns / Repair Service	19
CRESTRON Limited Warranty	19

Professional Surround Sound Tuning Kit

Introduction

Crestron's Professional Surround Sound Tuning Kit for the Adagio[®] Media System allows custom installers use the *Audyssey MultEQ[®] Pro* PC application to bring *Audyssey MultEQ[®] XT* sound equalization technology to high quality listening rooms. *Audyssey MultEQ[®] XT* creates an optimum listening experience for every seat in your theater using an ingenious equalization solution that automatically corrects the time, level and frequency response for each speaker within the space.

Every listening room or home theater room will add colorations to the direct sound coming from the loudspeakers. These colorations come from the natural resonances (also called *modes*) every room has and from wall, floor and ceiling reflections of the sound from the loudspeakers. *MultEQ[®] Pro* measures the sound information throughout the listening area. Based on these measurements, *MultEQ[®] Pro* calculates an equalization solution that effectively removes sonic colorations caused by the interaction of sound from the speakers with the room, allowing the speakers to attain their best possible performance.

Professional Surround Sound Tuning Kit



Setup

Supplied Hardware

The hardware supplied with the Professional Surround Sound Tuning Kit is listed in the following table.

Supplied Hardware for the Professional Surround Sound Tuning Kit

DESCRIPTION	PART NUMBER	QUANTITY
APM1 Microphone & CD with Calibration File	4504520	1
Cable Assembly, XLR to Stereo 3.5 mm, 5'	2017722	1
Cable Assembly, USB 2.0, Series "A" to "B" Plugs, 6'	2014966	1
Cable Assembly, Female Mini XLR to Male XLR, 6'	2018284	1
OEM Cable, XLR, 18'	2017745	3
OEM Boom Stand, Ultra Light	2017744	1

Installation

NOTE: The CD that comes with the Professional Surround Sound Tuning Kit contains a file specially configured for the individual microphone that also comes with the kit. Crestron suggests you keep the CD and the microphone together and also that you make a backup copy of the CD and store it in a safe place.

The Professional Surround Sound Tuning Kit requires that you have at least one of the following software applications installed on your PC:

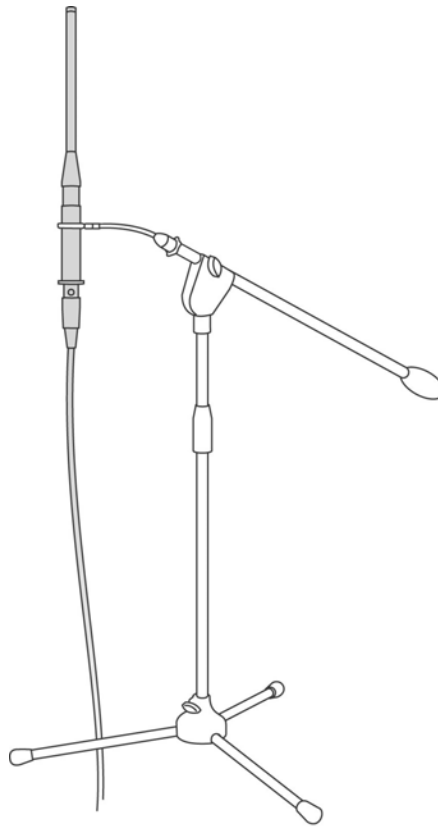
- Pro Sound Tools™ (version 1.00.19 or later)
- Crestron Toolbox (version 1.06.10 or later)

Hardware Hookup

While making connections, all components in the system should be powered *off*.

Place the microphone stand upright. Attach the microphone holder to the stand. Insert the microphone in a vertical position in the holder.

NOTE: You must place the microphone in a vertical position with the capsule facing the ceiling for all measurements. Refer to the illustration on the following page.

Microphone Stand and Microphone in Measuring Position

Connect the mini female XLR end of the female mini XLR to male XLR cable to the microphone.

Connect the male XLR end of the cable to the XLR end of the XLR to stereo 3.5 mm cable.

Connect the stereo 3.5 mm plug to the microphone input on the AMS. For details, refer to the latest version of the Adagio Media System Operations Guide (Doc. 6509) which is available from the Crestron website (<http://www.crestron.com/manuals>).

NOTE: The Professional Surround Sound Tuning Kit provides 3 18' XLR cables. If more cable length is required to reach the AMS, you can add these as needed in between the male XLR end of the microphone cable and the XLR end of the XLR to stereo 3.5 mm cable. You can chain multiple cables for a longer length if required. If additional XLR cables are needed, you may supply your own.

Using the USB cable included with the Professional Surround Sound Tuning Kit, connect your PC to the USB port on the front of the AMS.

NOTE: The USB connection is required for *Audyssey MultEQ® Pro* to function.

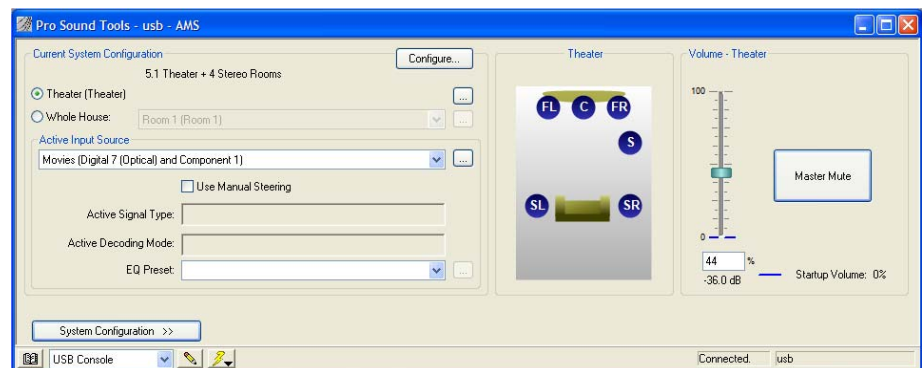
Operation

Initial Configuration

The *Audyssey MultEQ[®] Pro* application can be accessed directly through Pro Sound Tools or through Pro Sound Tools via Crestron Toolbox.

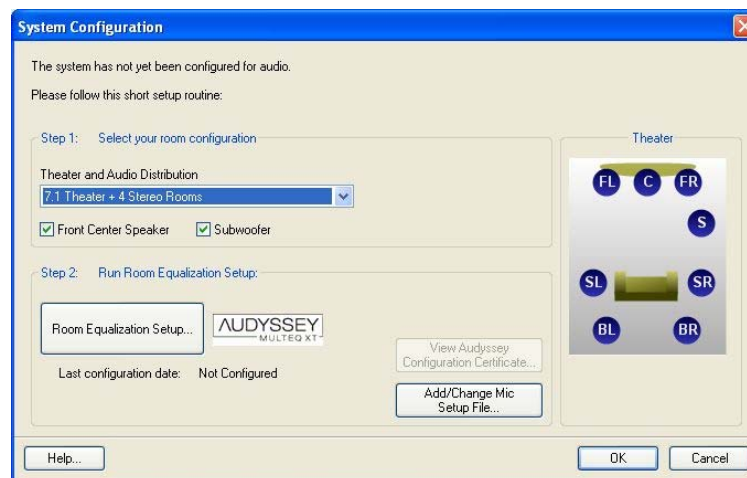
NOTE: When Pro Sound Tools is run for the first time, a setup wizard will run to take you through the necessary steps for your system. Thereafter, the **Configure** button can be used to initiate the process.

“Pro Sound Tools” Window



Click **Configure** at the top of the window to open the “System Configuration” window.

“System Configuration” Window



If you have not already installed the special file for the microphone that came with your Professional Surround Sound Tuning Kit, insert the CD that came with your kit and click **Add/Change Mic Setup File**. The application will present a standard “Browse” window where you can navigate to your CD drive and select the special file for the microphone that came with your Professional Surround Sound Tuning Kit. This should be “Audyssey Mic #####.apm” (where ##### represents the microphone serial number).

Room EQ setup

When the Pro Sound Tools application is launched it will provide a window for selecting the current system configuration (for example, 5.1, 6.1, 7.1 plus additional rooms, etc.). When a center speaker or subwoofer is not used, un-check the *Front Center Speaker* and/or *Subwoofer* checkboxes as appropriate, in order to enable “phantom” center and “phantom” subwoofer. The phantom setting will route center and/or subwoofer information to the main speakers.

Any subwoofer low-pass filter should be defeated or set to the THX setting (sometimes called “LFE input”). If the subwoofer low-pass filter cannot be defeated, set it to its maximum frequency. Any subwoofer gain settings should be set to their nominal position or at 12 o’clock on a conventional level control. Also, if the subwoofer has any sort of “Auto Standby” or sleep mode that turns the power to the subwoofer off after it does not receive any signal for some period of time, please disable this mode. This will ensure that the subwoofer is always on, which is important when taking measurements. The subwoofer may be set back to Auto after measuring is complete.

Click **Room Equalization Setup...** to begin the process.

NOTE: If you have not already done so, the application will prompt you to install the special file for the microphone that came with your Professional Surround Sound Tuning Kit.

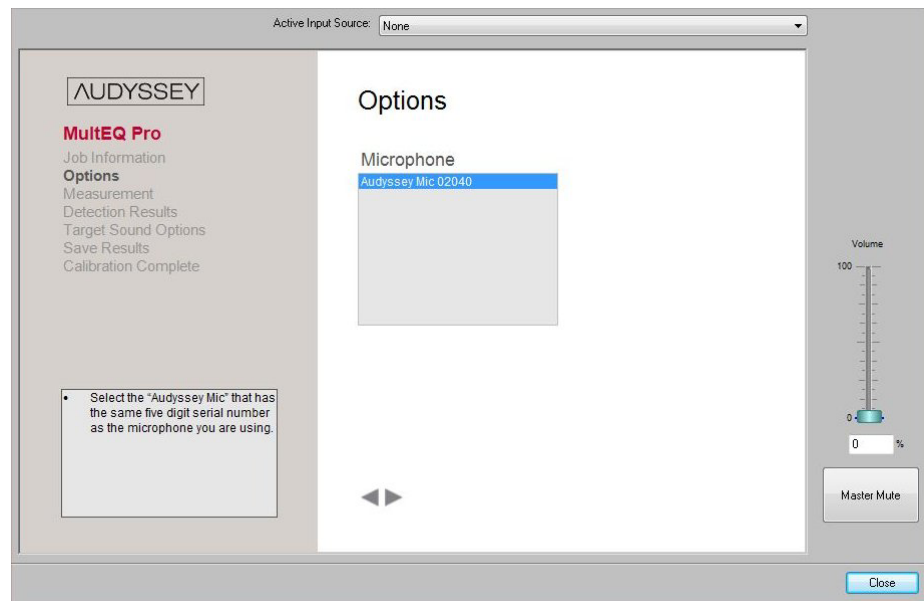
NOTE: The *Volume* control will function until the process gets to the *Job Information* screen, at which point the use of the volume control is disabled until the filters are transferred (refer to “Save Results” on page 11).

Job Information Screen

The screenshot shows the 'Job Information' screen within the 'AUDYSSEY MultEQ Pro' application. At the top, there is a dropdown menu for 'Active Input Source' set to 'None'. The sidebar on the left contains the following menu items: 'Job Information' (highlighted), 'Options', 'Measurement', 'Detection Results', 'Target Sound Options', 'Save Results', and 'Calibration Complete'. Below the sidebar, a text box contains instructions: 'Enter your customer's or the job name in the "Customer or Job Name" field.' and 'Enter your name in the "Technician Name" field.' The main area has two text input fields: 'Customer or Job Name' with the value '104 Oak Tree Lane' and 'Technician Name' with the value 'JP'. On the right side, there is a volume control slider ranging from 0 to 100, currently set at 0, with a 'Master Mute' button below it. A 'Close' button is located at the bottom right of the window.

The *Job Information* screen is used to record the name of the customer or job and the name of the technician performing the job.

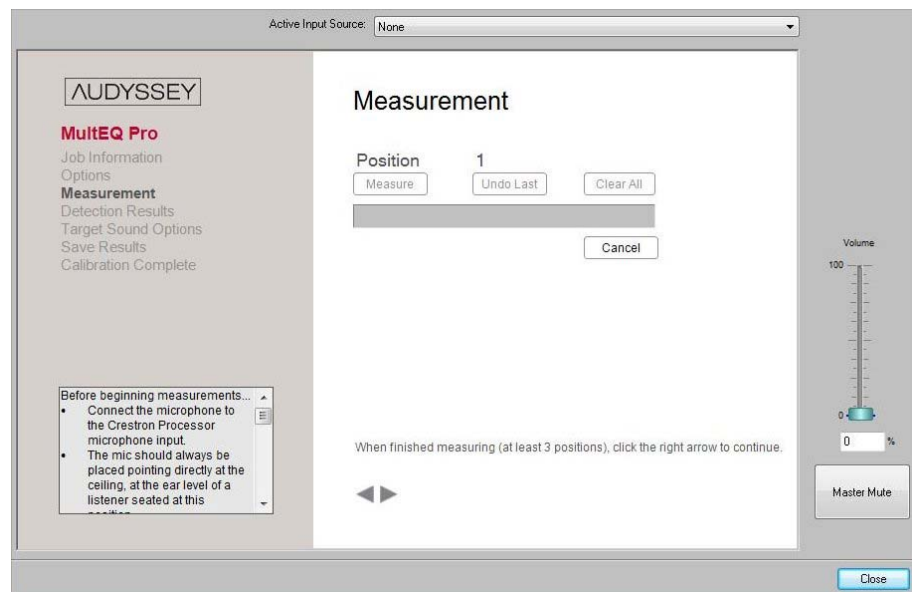
Click the forward arrow to proceed to the *Options* screen.

Options Screen

The *Options* screen is where you select the microphone file to match the microphone you are using. If you have more than one Professional Surround Sound Tuning Kit and therefore more than one microphone, it is important that you choose the correct serial number for the microphone you are using during the installation.

The serial number on the microphone setup file should match the one printed on the microphone.

Click the forward arrow to proceed to the *Measurement* screen.

Measurement**Measurement Screen**

The microphone should be positioned as far out from the stand as possible to minimize the effect of stand reflections.

NOTE: You must place the microphone in a vertical position with the capsule facing the ceiling for all measurements. Refer to illustration on page 3.

Quiet the room as much as possible. Background noise can disrupt the room measurements. Turn off cell phones, televisions, radios, air conditioners, fluorescent lights and other devices or home appliances. Close any open windows.

Refrain from talking and do not sit or stand directly between any of the speakers and the microphone during the room measurements. Each speaker will emit a series of test signals during the measurements and your body and background noise can disrupt the microphone's ability to properly record the room response to the test signal.

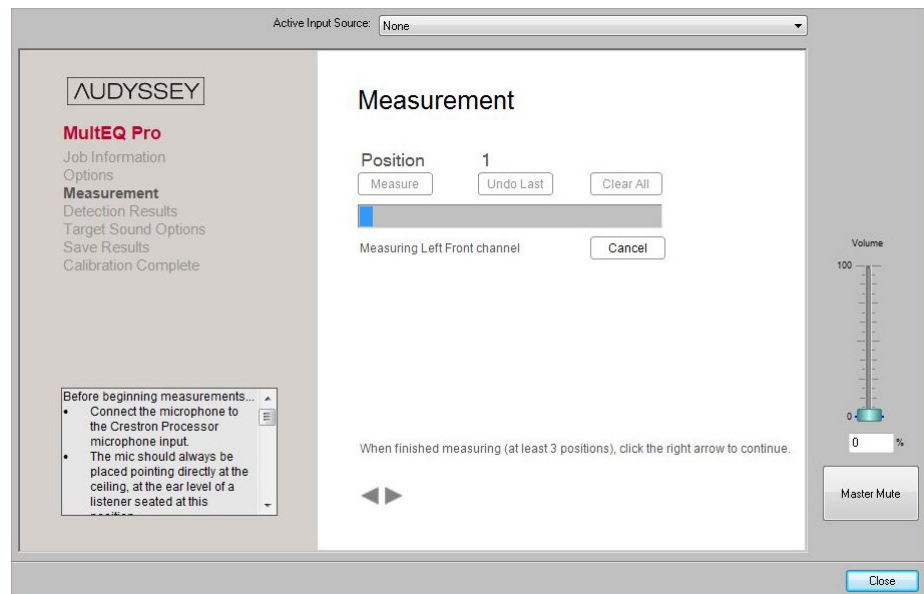
Position 1 Measurement

For the Position 1 measurement, place the microphone at the primary or most central listening location. The height should be the ear height of a listener seated at this position.

NOTE: It is important to have the microphone in the primary listening position for the first measurement. Every position measurement will record the room's frequency and time response but Position 1 also detects the absolute polarity of each speaker, calculates the exact distance (within a half inch) for setting delays and determines levels (within half a dB) for each speaker. The polarity, distance and level from the Position 1 measurement are displayed later on the *Detection Results* screen (refer to "Detection Results" on page 9).

Press the **Measure** button. The *Audyssey* test signal will play a series of 10 "chirps" through each channel. The name of the speaker being measured will be indicated under the status bar while the test signal plays.

Measurement Screen (Showing Position 1 Progress)



After the application is finished playing the 10 chirps through each channel, the application will transfer each channel's measurement (this takes several seconds).

Click **Undo Last** if you want to erase your previous measurement.

Click **Clear All** at any time to erase all your position measurements and go back to Position 1.

Additional Position Measurements

Move the microphone to another listening position and press the **Measure** button again. Repeat the process for all listening positions in the room. You will need to measure a minimum of three positions before you can continue. The recommendation is to measure a minimum of eight positions for typical rooms. Stagger the height of the microphone by a few inches from location to location to account for different listener heights.

NOTE: A minimum of three measurements is required. You will not be able to continue to the next screen in the application until the third measurement is complete.

The larger the room, the more positions you should measure (the maximum is 32 positions). Make sure you measure only in positions where people will be located while listening to the system (i.e. measuring in a far off corner where nobody would ever listen will not be beneficial and may detract from the overall benefit within the main listening area).

Audyssey MultEQ[®] Pro measures the absolute polarity of each individual loudspeaker. If any of your speakers are wired out of polarity (i.e. + and – reversed), the application will show you an error window that explains which loudspeaker(s) to check. You may then check the polarity problem before continuing with the application. It is recommended that you check for polarity problems by examining the wire connections at the amplifier, speakers and any splices in the speaker cables.

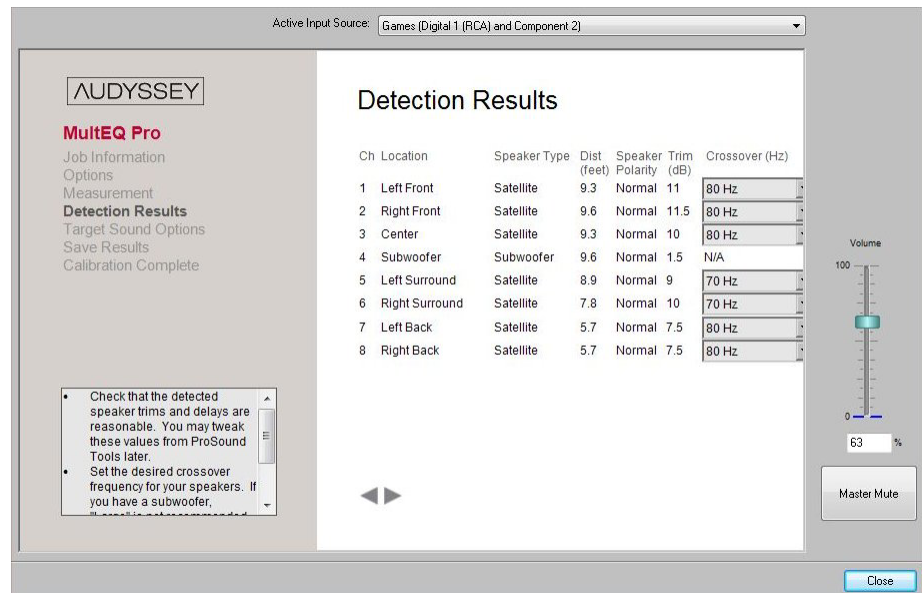
NOTE: In some situations, such as when the rear speakers are dipolar radiators, the program may show a polarity error even if the speakers are correctly wired. Correct wiring should be verified by checking the connections at the amplifier, speakers and any splices in the speaker cables.

Click the forward arrow to finish the measurement process and continue to the *Detection Results* screen.

NOTE: You can always return to the *Measurement* screen and measure more positions by clicking the back arrow (the application will remember the last measured position).

Detection Results

Detection Results Screen



This *Detection Results* screen displays the speaker *Distance*, *Polarity* and *Trim* results derived from your Position 1 measurement (refer to “Position 1 Measurement” on page 7) and the recommended *Crossover* derived from all of your position measurements.

- *Speaker Type* detects if the speaker connected to that channel is a satellite or a subwoofer.
- *Distance* (in feet) will automatically set the distance (delay) in the AMS.
- *Polarity* indicates whether or not the loudspeaker(s) are wired correctly. A *Normal* value indicates correct wiring. An *Inverted* value indicates the wiring polarity is probably reversed.
- *Trim* is displayed in dB. This number is not a dB SPL (absolute loudness) number. It is an absolute trim and must be used as shown. When applied, absolute trim gives reference level at the primary seat for volume set to 0dB. The *Trim* information will be automatically set in the AMS.
- *Crossover* is displayed in Hz. The *Crossover* information will be automatically set in the AMS. You can use the drop-down menus to override the crossover settings that will be sent to the AMS.

The *Audyssey* filter calculation is optimized based on your selected crossover frequency setting in the *Crossover* drop-down menus. Crossover choices are listed in descending order of preference to optimize satellite-subwoofer blending.

Only rarely should you ever choose the *Large* setting for the crossover. This setting means the bass for that channel will not be sent to the subwoofer. Only in the following situations, should you consider choosing the *Large* setting:

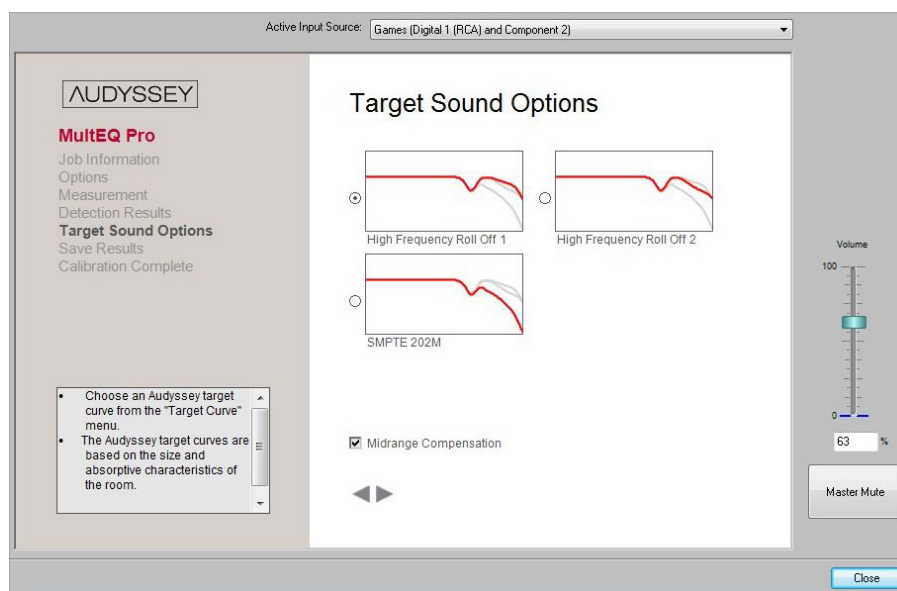
1. Your system does not have a subwoofer.
2. Your satellite speakers extend as low or lower in frequency than your subwoofer. Even in this case, however, you may not want to use *Large* because your subwoofer probably has better power handling for the bass.

NOTE: Even if the *Distance* shown for the subwoofer is longer than the physical distance, it is probably correct since subwoofers often have digital amps that delay the signal.

Click the forward arrow to proceed to the *Target Sound Options* screen.

Target Sound Options

Target Sound Options Screen



On the *Target Sound Options* screen, choose which of the *Audyssey* target curves you want to use by selecting the radio button next to the curve.

NOTE: To cover a wide range of room types, *MultEQ*[®] *Pro* currently provides a selection of three target curves.

1. The *High Frequency Roll Off 1* curve introduces a slight roll off at high frequencies that accounts for the balance between direct and reflected sound for a small to medium size rooms (room volume less than 2500 cu. ft.).
2. The *High Frequency Roll Off 2* curve introduces a slightly greater roll off at high frequencies that restores the balance between direct and reflected sound for medium to large size rooms (room volume between 2500 and 5000 cu. ft.).
3. The *SMPTE 202M* curve is an international standard for the high frequency roll off applied in a typical 500-seat movie theater. It is appropriate for professional mixing spaces and dubbing stages that must be calibrated for film sound post-production. It can also be used in extremely large playback spaces (room volume greater than 5000 cu. ft.).

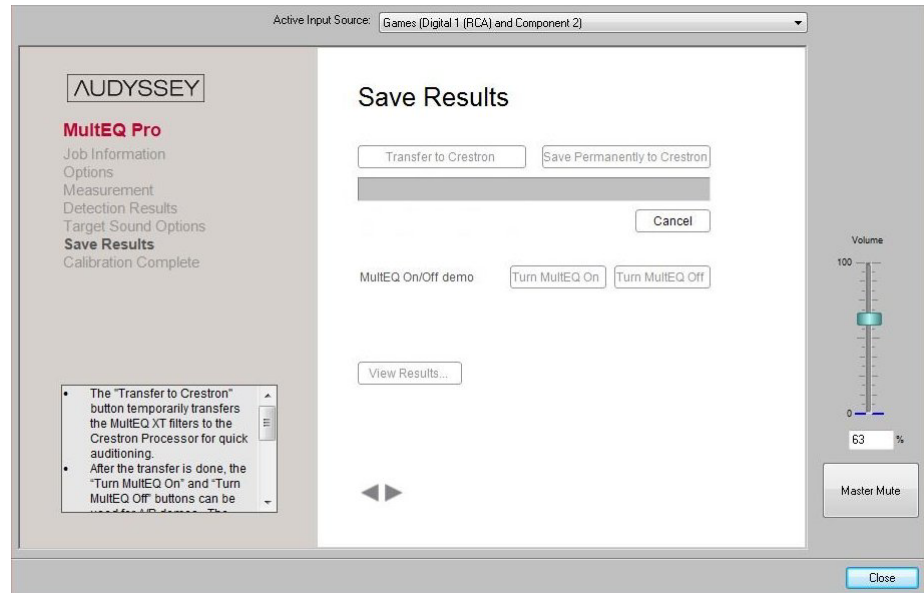
The *Midrange Compensation* option (selected by default) is used to properly adjust the balance between on-axis and reflected sound in the crossover region of the

woofer and the tweeter. You can return to this screen later and change your setting for this option if you prefer.

Click the forward arrow to calculate your correction curves and proceed to the *Save Results* screen.

Save Results

Save Results Screen



Transfer the MultEQ[®] XT Filters

Transfer the correction filters you have calculated by clicking the **Transfer to Crestron** button. This process temporarily stores the filters so you can listen to them before deciding to permanently save them. Previously saved filters will not be erased until you click the **Save Permanently to Crestron** button.

The **Transfer to Crestron** process may take several minutes. The download status bar will indicate the progress of the transfer.

NOTE: If the *MultEQ[®] Pro* application is turned off before the transfer is completed, the *MultEQ[®] XT* filters will be erased. The application will show a warning window asking you to confirm whether you wish to quit without saving.

NOTE: If the USB cable is disconnected between the processor and the PC during this process or before the process is complete, all measurements will be lost. If this happens, you must close the application, reopen it and start from the beginning of the application.

MultEQ[®] Pro On/Off Demo

After the results are transferred, the **Turn MultEQ On** and **Turn MultEQ Off** buttons will become unlocked and usable. You can use these buttons to demo the *MultEQ[®] XT* filters before deciding to save them permanently.

Insert program material into your source component. Play a track from the disc. Use the **Turn MultEQ On** and **Turn MultEQ Off** buttons to demo the *MultEQ[®] XT* filters.

NOTE: If the customer is present during the *MultEQ[®] Pro* On/Off demo, have them sit or stand within the room area you measured earlier. If they are not positioned inside this area, it is less likely they will hear the full effect of the *MultEQ[®] XT* filters.

Change the MultEQ[®] XT Filters

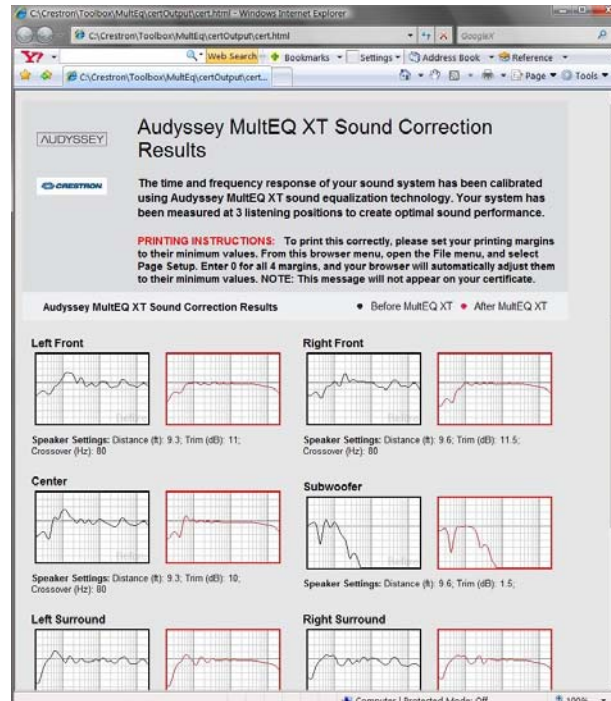
There are two options for changing the *MultEQ[®] XT* filters:

1. Add more measurement positions or redo your measurements. Click the back arrow until you get back to the Measurement screen (refer to “Measurement” which starts on page 6).
2. Calculate the *MultEQ[®] XT* filters with a different target curve. Click the back arrow to go back to the Target Sound options screen (refer to “Target Sound Options” on page 10).

View MultEQ[®] Pro On/Off Frequency Response Curves

Click the **View Results** button to view a graphical display of the frequency response correction for each channel. For each channel, the graphs on the left are without the *MultEQ[®] Pro* correction applied, while the graphs on the right are with the *MultEQ[®] Pro* correction applied (refer to illustration below).

“Sound Correction Results” Window



NOTE: Before the changes have been permanently saved, the “Sound Correction Results” window will show the word “DRAFT” in large letters. In the illustration above, the window is shown as it will appear after the changes have been permanently saved.

NOTE: Depending on the browser you are using and its security settings, you may see a message when you click **View Results**. For example, with Internet Explorer® you may see a message that says “To help protect your security, Internet Explorer has restricted this file from showing active content that could access your computer. Click here for options...” (refer to illustration that follows this note). When you enable, you will see the full graphic. This will occur for the “DRAFT” view, not after the results have been saved permanently.

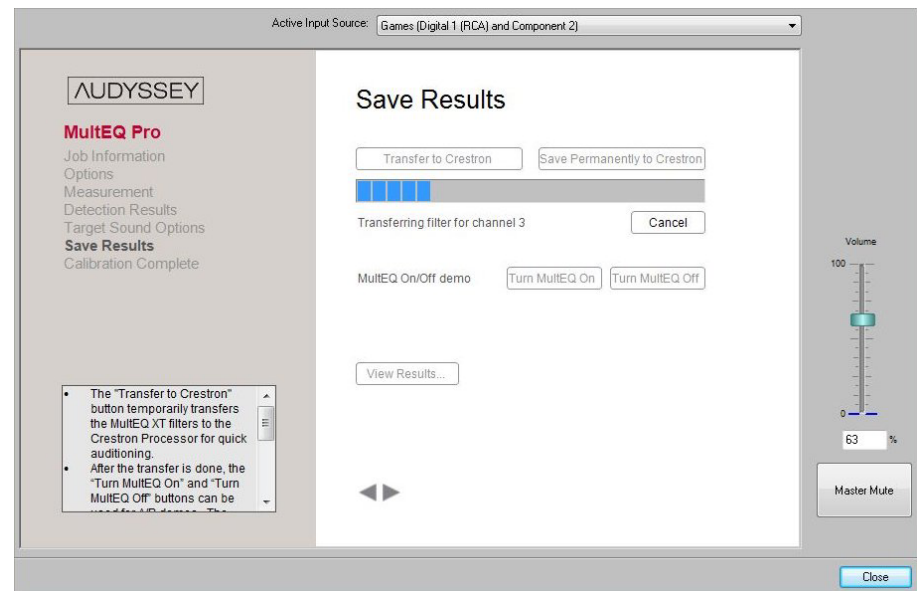
Warning Message in Internet Explorer®



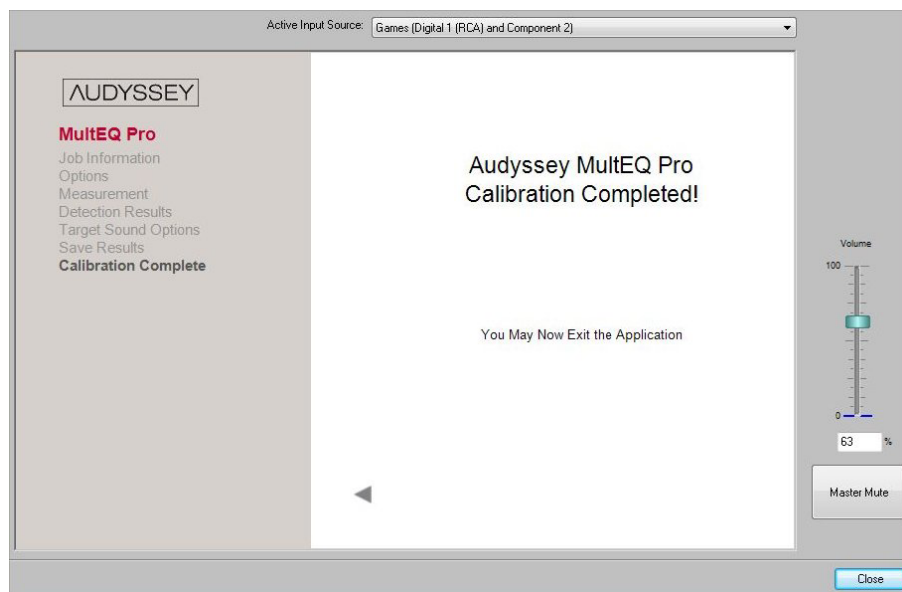
Save the MultEQ® XT Filters

If you are satisfied with the *MultEQ*® *XT* filters, click the **Save Permanently to Crestron** button. This action may take several minutes. The status bar will indicate the progress of this action (refer to illustration below).

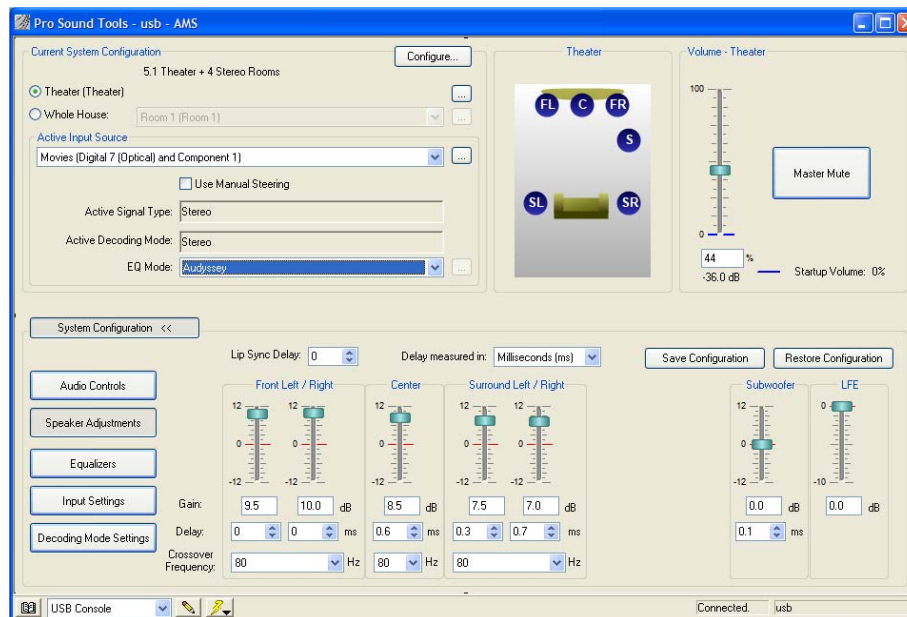
Save Results Screen (Shown in Progress)



After saving the *MultEQ*® *XT* filters, you will see a “Calibration Completed” message and can leave the application by clicking **Close** in the lower right corner of the window.

Calibration Completed Screen**MultEQ[®] Pro Settings in Pro Sound Tools**

The *Gain*, *Delay* and *Crossover* settings determined by MultEQ[®] Pro can now be viewed in Pro Sound Tools (refer to illustration below). Pro Sound Tools also allows you to change any of these settings to suit your individual tastes or requirements.

“Pro Sound Tools” Window (Showing Audyssey Settings)

NOTE: Even if the *Distance* shown for the subwoofer (refer to “Detection Results” on page 9) is longer than the physical distance, it is probably correct since subwoofers often have digital amps that delay the signal.

Problem Solving

Troubleshooting

The following table provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

Professional Surround Sound Tuning Kit Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
“Crestron processor was not detected...” message.	USB cable not connected.	Make sure USB cable is securely connected between PC and AMS.
“Input signal is too low” message.	Program does not detect a strong enough input signal for measurement.	Check that microphone is properly connected (refer to “Hardware Hookup” which starts on page 2).
	Bad microphone cable.	Change microphone cable.
“Ambient noise” message	Room is too noisy.	Refrain from talking. Turn off cell phones, televisions, radios, air conditioners, fluorescent lights and other devices or home appliances. Close any open windows.
“Communication with the device failed” message.	Program does not detect any signal at all.	Check that microphone and cables are properly connected (refer to “Hardware Hookup” which starts on page 2).
Inverted polarity message.	One or more speakers may be wired in reverse polarity (i.e. + and – wires reversed).	Check wire connections at the amplifier, speakers and any splices in the speaker cables. Make sure + on amplifier goes to + on speaker and that – on amplifier goes to – on speaker.

Reference Documents

The latest version of all documents mentioned within the guide can be obtained from the Crestron website (<http://www.crestron.com/manuals>). This link will provide a list of product manuals arranged in alphabetical order by model number.

List of Related Reference Documents

DOCUMENT TITLE
Adagio Media System Operations Guide

Further Inquiries

If you cannot locate specific information or have questions after reviewing this guide, please take advantage of Crestron's award winning customer service team by calling the Crestron corporate headquarters at 1-888-CRESTRON [1-888-273-7876]. For assistance in your local time zone, refer to the Crestron website (<http://www.crestron.com/offices>) for a listing of Crestron worldwide offices.

You can also log onto the online help section of the Crestron website (<http://www.crestron.com/onlinehelp>) to ask questions about Crestron products. First-time users will need to establish a user account to fully benefit from all available features.

Future Updates

As Crestron improves functions, adds new features and extends the capabilities of the Professional Surround Sound Tuning Kit, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron website periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.

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