C-Bus Multi Room Audio

Application Note #2 – Configuring MRA with MARPA Software

After you have created a project using Toolkit as described in Application Note #1, use this document to configure the MRA using the MARPA software. Connect your PC to the local LAN at the installation and connect the PC to the USB socket on the rear panel of the Matrix Switcher you are configuring.

Example Project

Before we begin, we need to compile a list of each **Source** (an input into the MRA system) and **Zone** (an area where an amplifier is installed). The tables below show the sources and zones for the example project. These examples are used throughout the series of MRA programming application notes to help you understand the MRA product.

In the Inputs table, the left column shows the source name, which is fixed in the MRA world. The middle column shows the type of input, while the right column shows a 'real world' name or description applied for easy identification. The Outputs table shows eight zones (or locations) for the example project.

Inputs (Sources)

Source	Type	Description
Local*	Line-level input on amplifier	iPod
Analogue 1	Line-level input #1 into Matrix Switcher	Cable TV
Analogue 2	Line-level input #2 into Matrix Switcher	DVD
Analogue 4/ AUX**	RCA phono jacks on the rear panel of the Matrix Switcher 3.5mm AUX input socket on front panel of Matrix Switcher	AUX
Tuner 1	Internal AM/FM tuner	Radio 1
Tuner 2	Internal AM/FM tuner	Radio 2
Streaming	Internal Streaming Module (deluxe model of Matrix Switcher only)	MP3

* The local input on the amplifier does not need to be configured for operation, but its position is reserved. This allows for a total of six additional source inputs to be configured on the Matrix Switcher

** The 3.5mm AUX socket on the front of the matrix switcher is internally (electrically) connected to Analogue Input 4. Either the AUX socket OR Analogue input 4 may be used, not both.

Outputs (Zones)

Zone No	Description (location)
Zone 1	Living
Zone 2	Bathroom
Zone 3	Bedroom
Zone 4	Ensuite

Zone No	Description (location)
Zone 5	Patio
Zone 6	Pool area
Zone 7	Dining
Zone 8	Study

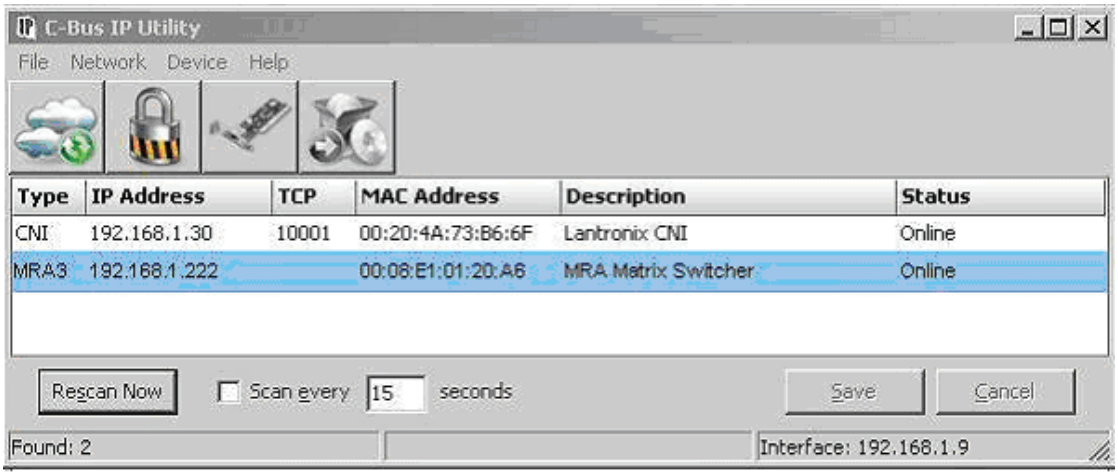
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Getting Started

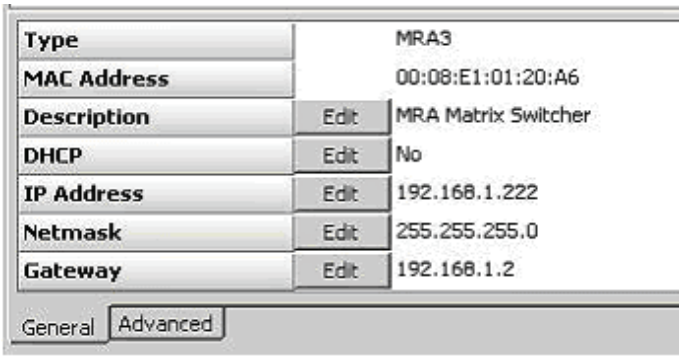
If your matrix switcher contains a streaming module, you need to configure its IP address. You must use the C-Bus IP Utility that is installed when you install the MARPA software on your PC. It is assumed that the installer has some understanding of computer network configuration and the basic principles of IP Addressing.

Before you can configure the IP address, you need to know the address range of the local network where you are installing the system. After you have determined the address range and have identified the address you want to assign to the matrix switcher, start the C-Bus IP Utility software.

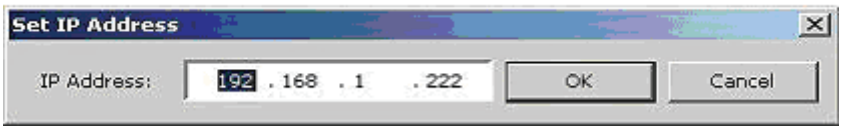
The IP Utility is used to configure all C-Bus IP devices such as CNIs (C-Bus Network interfaces) and matrix switchers. When you scan your network, be sure to identify the correct device for configuration by its description in the list. The image below shows a scan of a network. The line highlighted in blue, shows that the scan found a Matrix Switcher on the network and also a CNI.



To change the IP address of the unit, click the line highlighted in blue. You will have the option to view the details for the interface, and the ability to change the configuration for the unit.



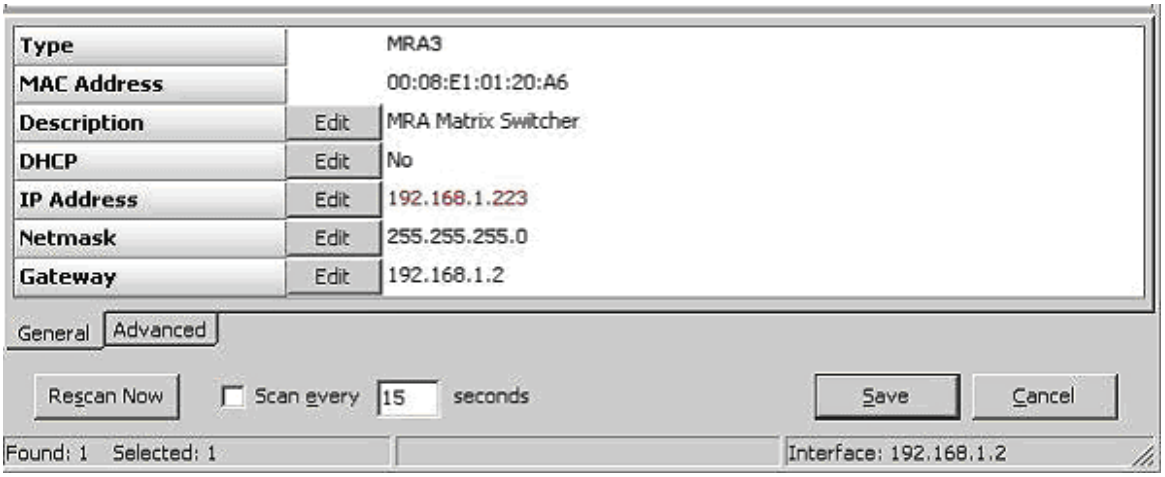
We wish only to change the IP address. In order to do this, click the Edit button on the IP address line. You will then see the following option box.



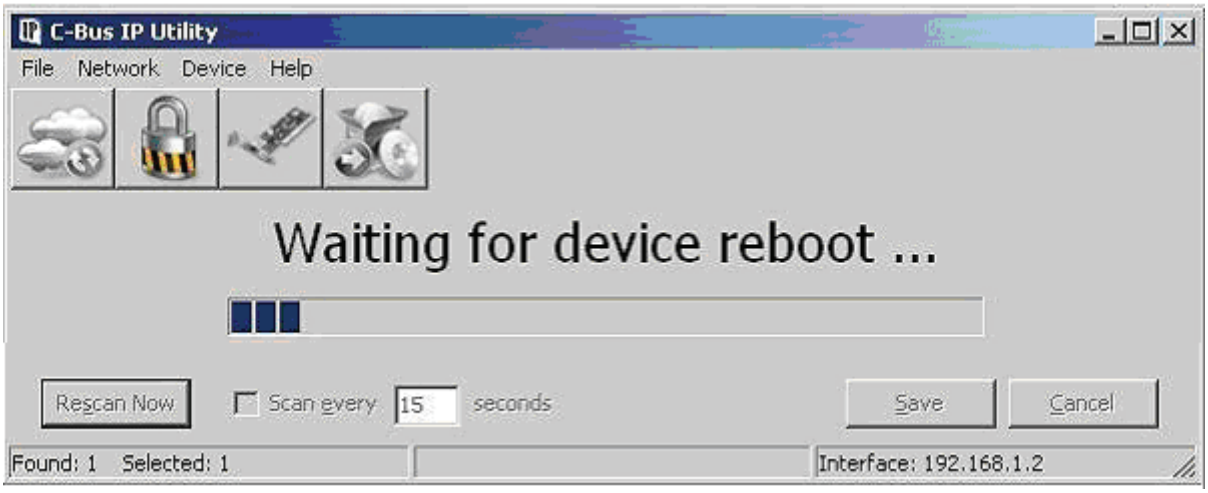
Enter the new address and click on the OK button.

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Any changes you make will be highlighted in red. Notice the altered IP address in the image below



In order to save the changes to the unit, you must click the Save button at the bottom of the screen. You will see the following device reboot screen appear.



After the device reboots, rescan the network. Your device should appear with the new IP address.

Please continue to the next page.

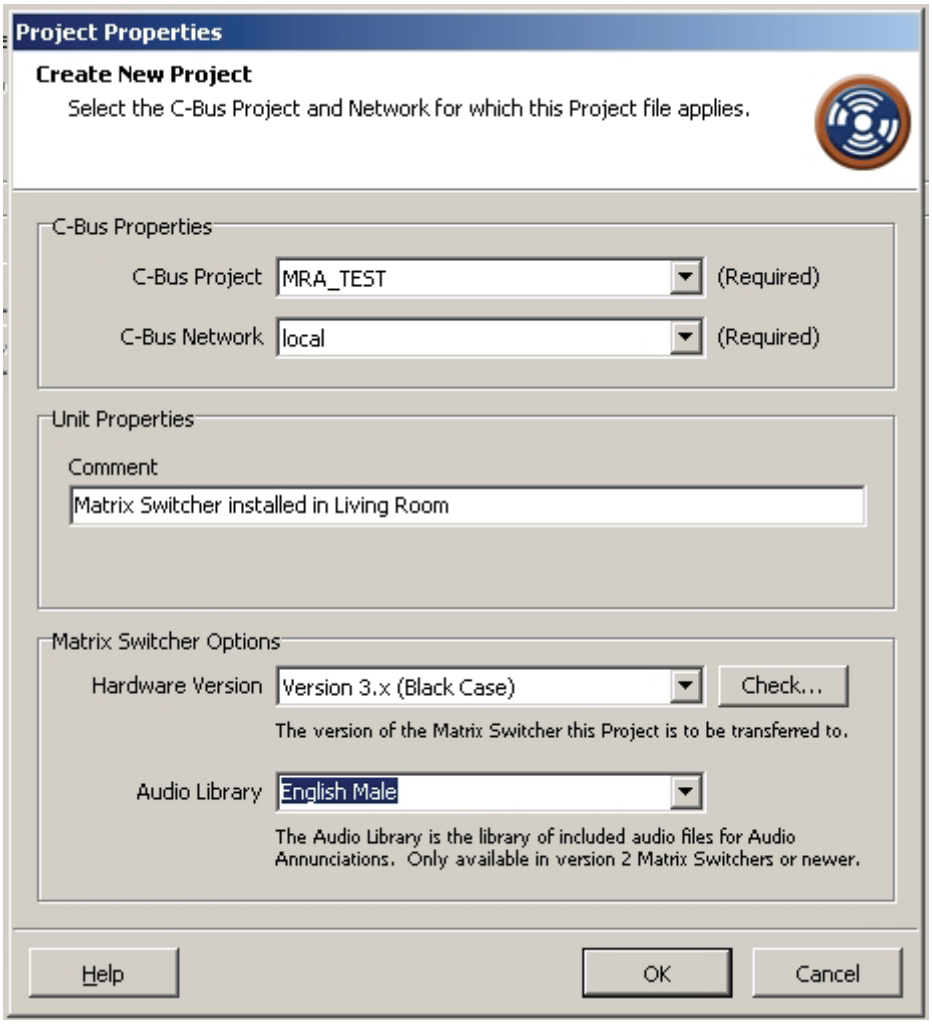
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MARPA Programming

There is an assumed basic level of understanding of MARPA programming. However, this Application Note tries to cover most of the fundamentals used for programming the C-Bus Multi-Room Audio (MRA) system. This note does not cover any hardware configuration. Please refer to the *MRA Matrix Switcher and System Installation Instructions* for system hardware installation and configuration information.

Create a Project

Start the Multi Room Audio programming software called MARPA and create a new project. You will be presented with the following dialogue box. This application Note only covers the version 3 matrix switcher (black case) configuration and setup.

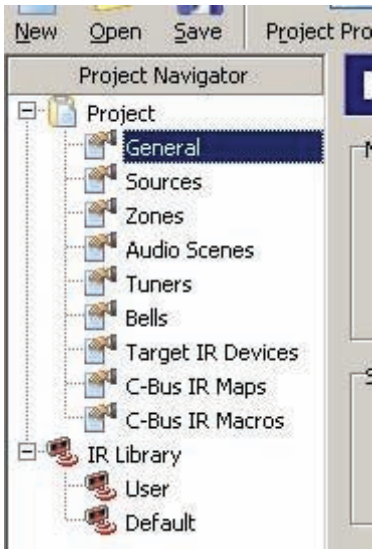


You must select a valid C-Bus project that was created using C-Bus Toolkit configuration software and the C-Bus network where the matrix switcher is to be installed. The only other field that requires some explanation is the audio library. There is an option for annunciation of sources when they change through the zone speakers. Several pre-recorded libraries of voices are provided for this feature with the option for choosing the preferred library.

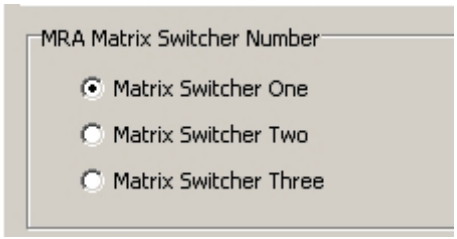
Note: The project must be transferred into the matrix switcher when you are ready to test it. The MARPA software doesn't work 'live' with the matrix switcher.

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After you have created a project, you see the General Configuration Screen. Use the tree view on the left side of the screen to navigate between the various configuration screens.



It is possible to configure up to three Matrix Switchers to operate on a single network. This gives you the ability to have up to 24 individual zones. The configuration of each matrix switcher can be performed within the single MRA project you have created. The MRA Matrix Switcher Number option is used to select which matrix switcher is to be programmed. In most installations, a single matrix switcher is used.

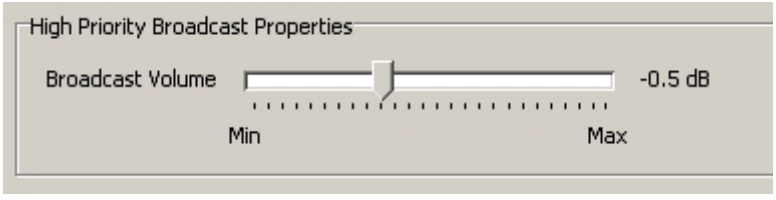


Controlling the Backlight of the LCD

It is possible to control the backlight of the matrix switcher LCD screen with a group on C-Bus. Select the Setup button option for the configuration of this group and select a group address for applying control.

High Priority Broadcast

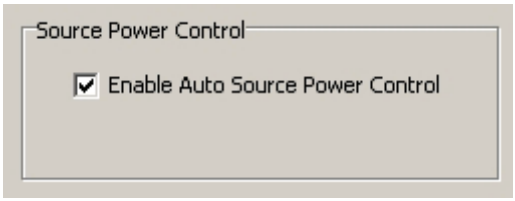
The system comes with the ability to issue high priority broadcast messages to all zones that have this feature enabled (enabling is performed in the amplifier setup in Toolkit). To change the volume of this broadcast, use the slider located on the general tab.



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Source Power Control

If the Enable Auto Source Power Control option is checked, the system will issue a power off when all zones using the source are off.

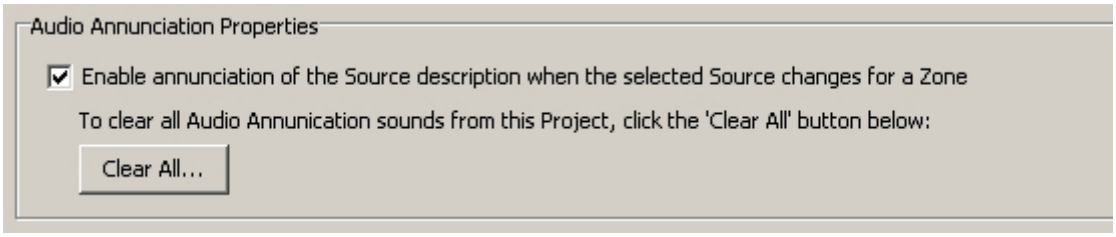


An example of this is where you have IR control of a CD player. When no zone is using the CD player, the system will issue a command to the CD player to switch off.

Audio Annunciation Properties

It is possible for the system to announce the name of the source when it changes. The announcement is sent over the zone speakers. This feature is a global function. If enabled, the source change will be announced in each zone when that source for that zone changes, but doesn't need to occur for each source.

If this option is checked, the actual sound to be played is configured on the tab for each of the sources. If no sound is configured for a source, then nothing will be played when that source is selected.



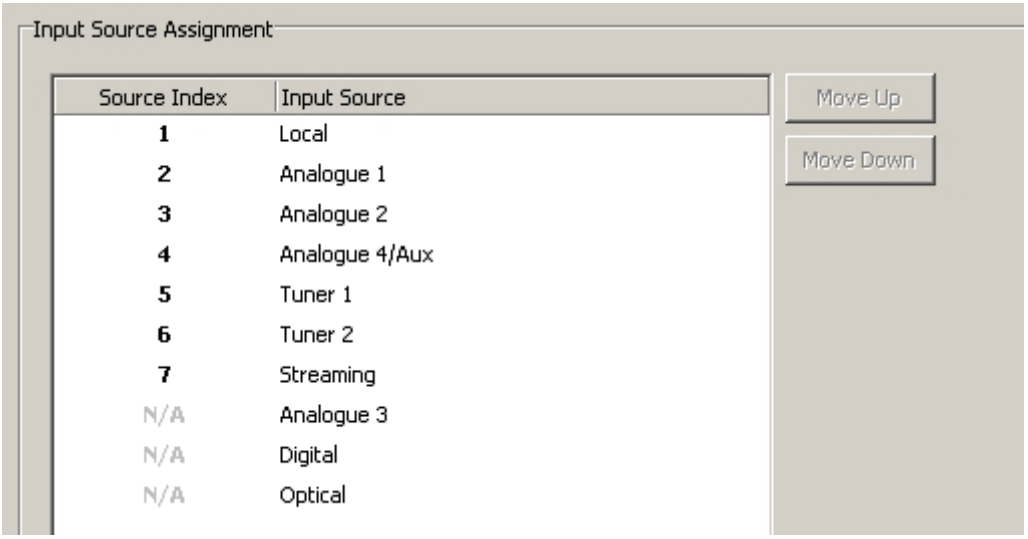
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Input Source Assignment

A total of eight input sources can be achieved. However, two are fixed sources. The 'Local' source, regardless of whether it is used or not, will always be source number 1. The other fixed source is the broadcast source that (like the Local source) is optional. The other six sources can be configured for use during the installation process. The optional sources are:

- 4 x Analogue, line level inputs*
- 2 x AM/FM Tuners (internal)
- 1 x Streaming interface (internal)
- 1 x Optical Input
- 1 x MRA Digital Input



Notes: The 3.5 mm AUX socket on the front of the Matrix Switcher is internally (electrically) connected to Analogue Input 4 (connected to RCA input #4 in the rear of the matrix switcher. Either the AUX socket OR Analogue input 4 may be used, not both.

The AUX input socket is designed to accept the output from devices such as portable MP3 players. These players typically have a headphone connection that is suitable for the AUX input using a 3.5 mm-to-3.5 mm patch lead. The level of the headphone signal is generally lower than the line-level input. The matrix switcher includes gain circuitry to boost the signal received on the AUX input.

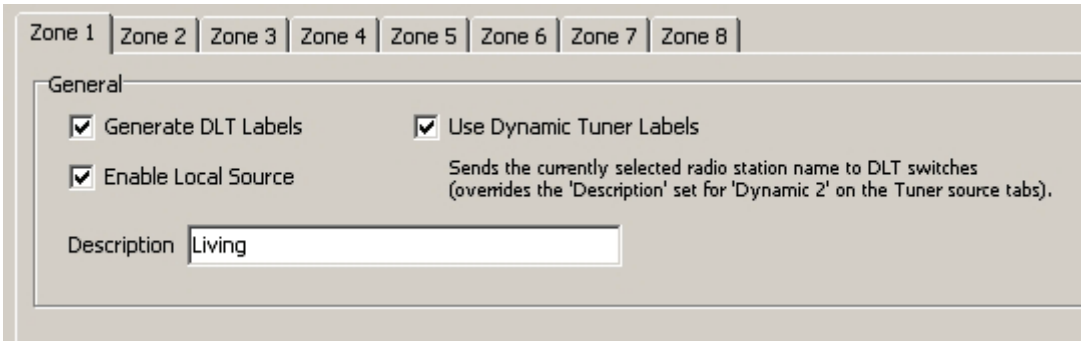
The above Input Source Assignment offers the ability to set the order of the sources. The Source Index number is important for selecting the absolute source through advanced programming, covered in *Application Note #3 – Configuring MRA with PICED Software*.

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Zones

The Zones page lets you configure specific requirements for individual zones of the MRA system.



Generate DLT Labels

If the zone is controlled using a DLT switch, then the Generate DLT Labels option needs to be checked to allow the dynamic text to be sent over C-Bus. The reason for not always having this option checked is to reduce the amount of unnecessary traffic over C-Bus, when DLT switches are not in use.

Enable Local Source

If the zone has a local source connected (to the amplifier), then you must check the option to enable the local input to be included in the cycling of possible of sources.

Use Dynamic Tuner Labels

If the zone includes a DLT for control and there is to be at least one radio tuner configured, the Use Dynamic Tuner Labels option should be checked. This will enable the matrix switcher to broadcast the station ID (i.e. XXXFM) to the DLT when the station preset is selected. Note that this feature only operates with Dynamic 2, outlined further on the Tuners setup page. This feature differs from the information broadcast that is covered later.

Description

The description field provides assistance for the installer when configuring the system. This information is not broadcast out onto C-Bus for display anywhere.

Sources

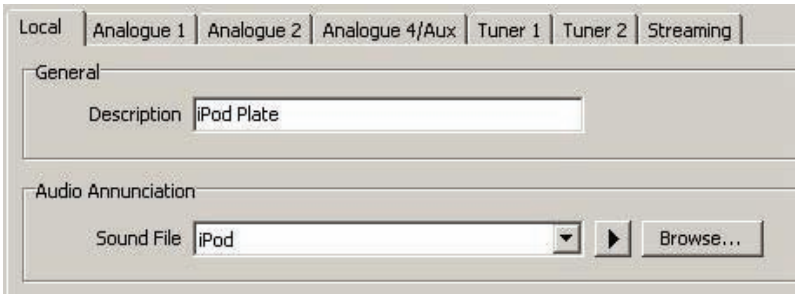
The Sources (inputs to the matrix switcher) page contains the bulk of the configuration required for setting up an MRA system. The configuration parameters selected here include mapping of IR codes and labels to send to DLT plates.

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Local Tab

If a local source input is required on **any** of the zones, there is a small amount of configuration required on this tab.



General-Description

The Description field contains the text that will be displayed on a DLT switch, when the source is selected. Care must be taken with this description to make it generic enough, as it is a global description that will be used for each zone where a local source exists. The text in our example would probably need to be 'local' if there were not an iPod plate in each zone where a local input is configured.

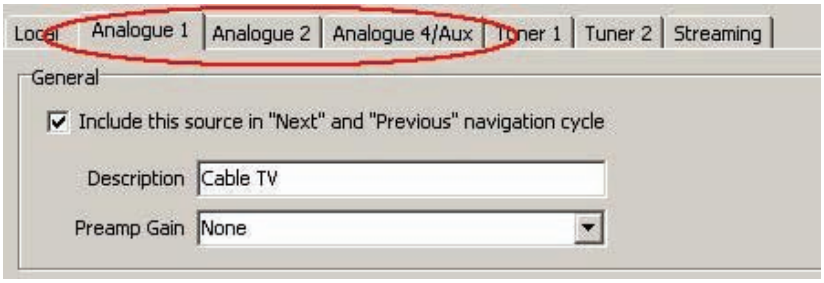
Audio Annunciation-Sound File

The Audio Annunciation option will only be available if the audio annunciation was enabled on the General page. The option to select a pre-loaded sound file, or a WAV file of the installers' choice, by using the browse option can be applied here. A Test Play' button is provided to check the sound file through the installed PC speakers.

The Description and Audio Annunciation options described above appear on each tab for each source type. Perform the same function for each source.

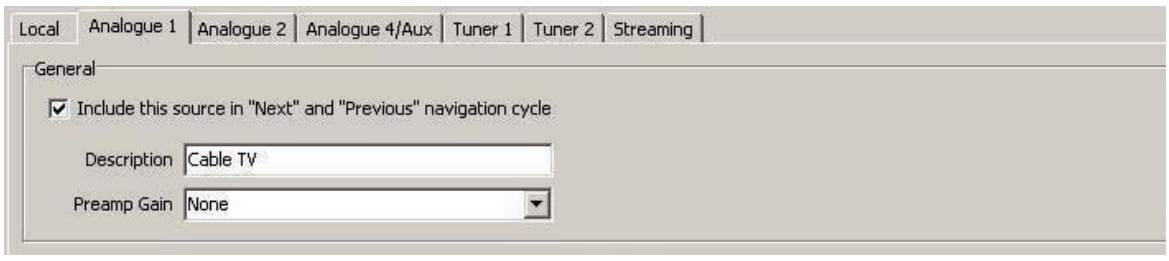
Analogue Tab

There are up to four analogue source input tabs available, depending on how many were configured in the Input Source Assignment option on the General page.



General–Description

The Description field contains the text that will be displayed on a DLT when the source is selected for a particular zone. The Preamp Gain enables the analogue zone to have the perceived volume adjusted so that there isn't a discrepancy between it and the volume of other sources when changing source. The gain can be -6 db, -3 db, 0 (none), +3 db or +6 db.



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Dynamic Functions

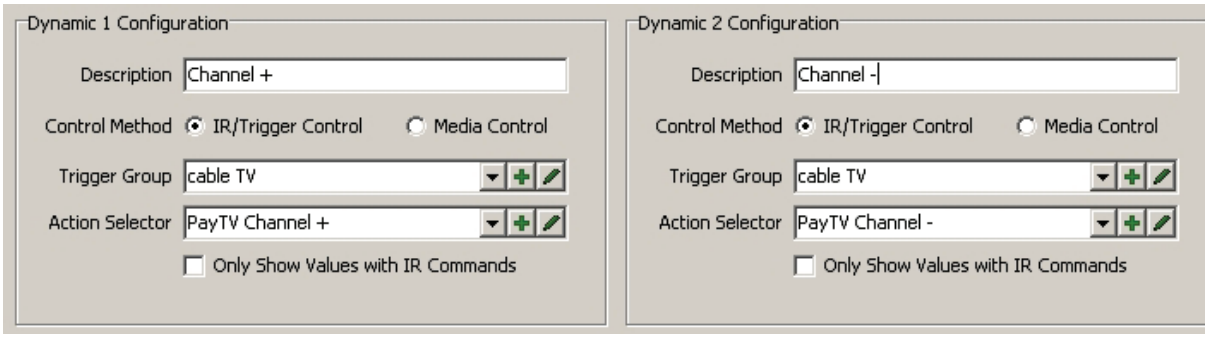
The Dynamic Functions are very powerful and give the MRA system the ability to change the functionality of a switch, depending upon the selected source. For example, when the source is a radio tuner, Dynamic 1 may be used to select the next preset radio station. When the source is a CD player, the Dynamic 1 may be used to provide 'Next Track' functionality.

Description

The description entered is what will be displayed on a DLT when the source is selected.

Control Method

The control used with the dynamic configuration may use either (1) the IR/Trigger Control application or (2) the Media Control application. As a general rule of thumb, IR Trigger Control is used when you need the matrix switcher to control third-party devices through IR commands (out of the IR ports located on the back), whereas Media Control is used to control internal functions such as the on-board tuners or streaming capability.



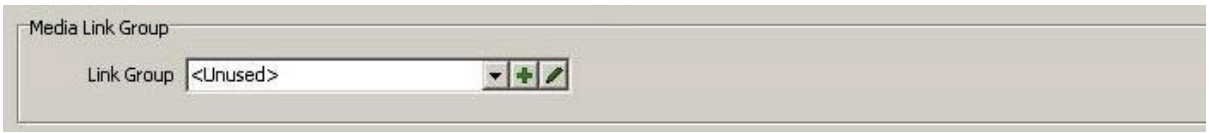
This example shows control of a pay-tv decoder. IR commands are generated when events are triggered through trigger groups and action selectors.

If the IR Trigger Control is used, the control of the function is a trigger group and action selector that can then be tied to an IR command (IR is covered later in this document).

The Media Control Application is used with enhanced functionality found in devices programmed with the PICED software such as touchscreens.

Media Link Group

The Media Link Group is a relatively new application that is used with pre-defined commands such a play, pause, stop, etc. for control and status over C-Bus. It is mainly used with new internal devices such as tuners and music streaming. It is covered in greater detail in the tuners and streaming tabs as well as in the PICED application note.



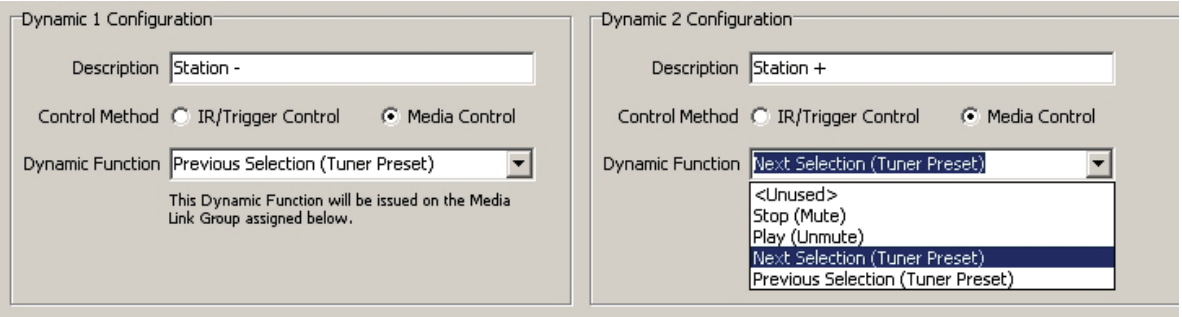
Audio Annunciation

Audio annunciation (found on this tab) behaves in the same way as described in the local input tab section of this document.

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Tuner(s) Tab

The Matrix Switcher includes two on-board AM/FM tuners. Setting of the radio stations as Tuner Presets is configured at commissioning time (this is covered in greater detail, in the Tuners Page section of this document). It is possible to control the selection of the Preset Tuner Station in a number of ways, depending upon the method of control. The example below shows the configuration for controlling a tuner using the Media Control application.



The Description field (in this example, Station +) shows what will be displayed on the dynamic label of a switch like a DLT (when the tuner source is selected).

You then have the ability to tell the system what to do when it receives a command on the Dynamic group, i.e., Stop (Mute), Play (un-mute), Next Selection (tuner preset) Previous Selection.

If you wish to display the station ID i.e. XXXFM (this also needs configuration in the tuners section of this document), you must have checked Use Dynamic Tuner Labels. Refer to the Zones page. The Display Radio Station ID only works on Dynamic 2 and not on Dynamic 1.

Notes: This functionality is on a per-zone basis. If you want to display the station ID in every zone with a DLT (when the tuner is selected), you must check the box for every zone (refer to Zones tab information earlier in this document). If you don't check this function on the Zones configuration page, then the Description you have entered (in the above example, Station +) will be displayed.

The two tuners operate completely independently of each other and are controlled independently of each other too. When configuring the Media Link Groups for Tuner and Streaming control, it's good practice to use the following rule of thumb. This will make it easier to remember which Media Link Group controls what, if you need to configure Media Control on a touchscreen later.

Media Link Group 000 Streaming Control
Media Link Group 001 Tuner 1 Control
Media Link Group 002 Tuner 2 Control

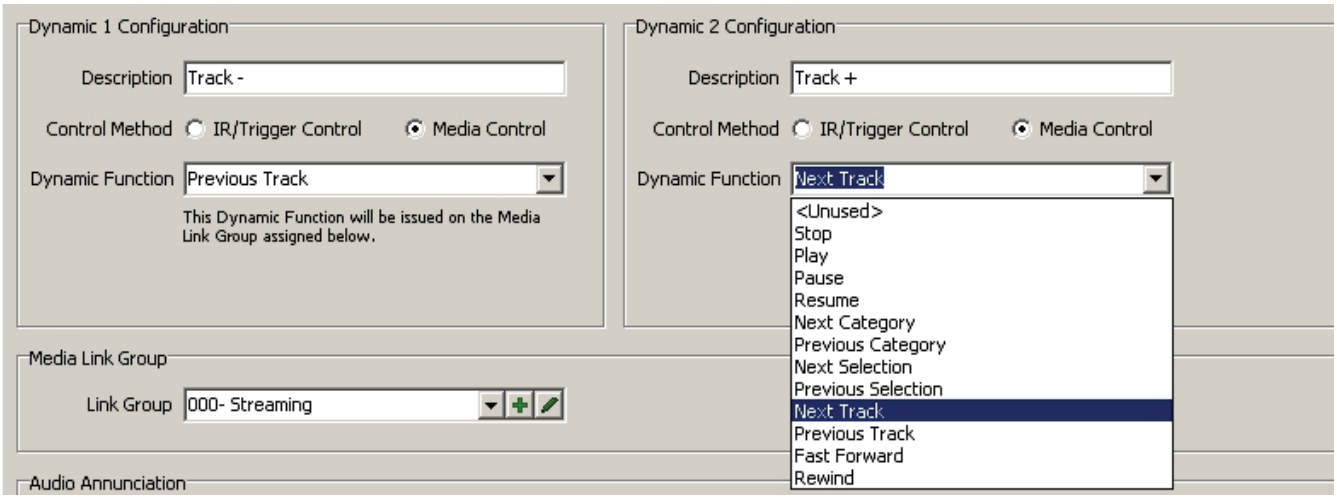
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Streaming Tab

Setup for streaming control is virtually the same as tuner control except there are more functions to use on the Media Control application.

The screen below shows the commands that are available in the streaming module. The streaming functionality works in conjunction with a piece of free server software called C-Bus Ripple that enables the ability to stream MP3 files as well as Internet radio. There is an application note available for configuration of the C-Bus Ripple software.



Some of the commands used in the Dynamic function for streaming operate on a hierarchical basis. Standard transport control such as Stop, Play, Pause, Resume, Fast-Forward and Rewind are fairly obvious.

Control (next and previous) of a Category, Selection or Track, however, form part of the hierarchical setup according to their functions. Below is a quick overview of the control-selection-track hierarchy.

Level 1 – **Category**

e.g., .Artist Album Genre

Level 2 – **Selection**

What was selected as the Category determines what is displayed in Selection. If Genre is selected as the Category, then the Selection may be...

e.g. .Rock Blues Pop 80's

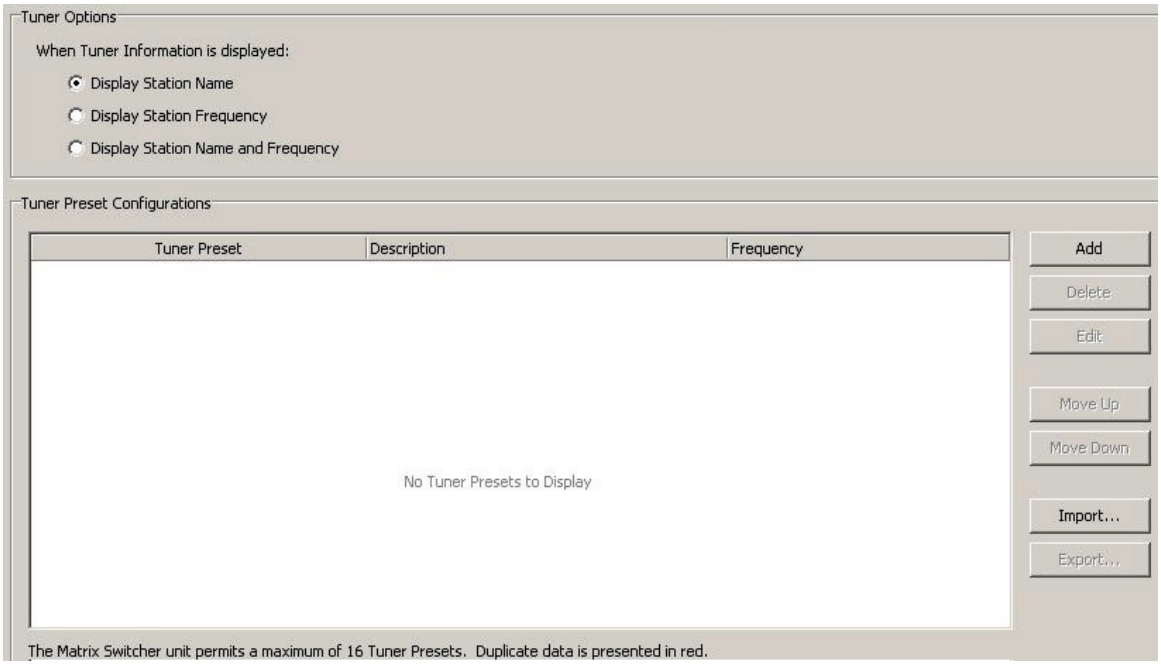
Level 3 – **Track**

Depending on what has been selected in the Category and the Selection, will determine what is displayed in the Track information.

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Tuners Page

The two internal AM/FM tuners operate by selecting from a list of presets configured by the installer.



The installer can add individual stations to the preset list. Although there is a limit of 16 presets that can be loaded into a matrix switcher, there is no limit to size of the list that can be created and saved as a template. The template is saved as a CSV file.

The Tuner Options at the top of the page refer to the information that is sent out onto C-Bus for display on devices such as touchscreens. If the Display Station Name option is selected, only the information in the description filed is sent out.

If the Display station frequency option is selected, only the frequency (without kHz, MHz or the AM/FM band info) is sent out. If the Display Station Name and Frequency option is selected, both the Description and the frequency (with a space delimiter between) are sent out.

The display on the front of the Matrix Switcher will always display the Description and frequency of the configured tuner(s). The label sent to a DLT (if configured) will be the description only and is limited to 8 characters.

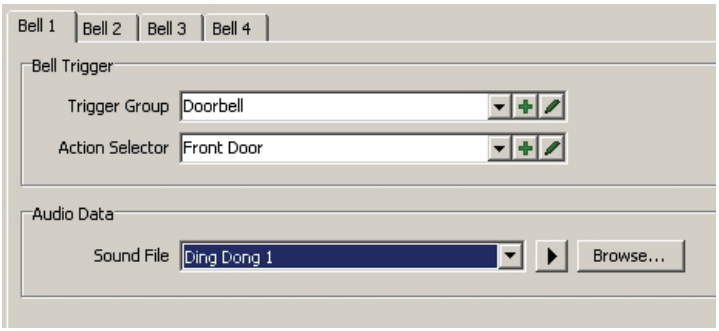
Note: There is an option for 'absolute' station preset selection. Such that if you select a preset number through Selection in Media Link Group control, that station preset will be selected. This option can be used instead of cycling through all of the presets. This is described in greater detail in the PICED Application Note.

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Bells Page

The MRA system offers a doorbell feature. This is the ability to play a pre-defined sound through specified amplifiers if a trigger group and its action selector are activated. The obvious use for this is as a doorbell but there are many other uses including notification messages such as 'you have email.'

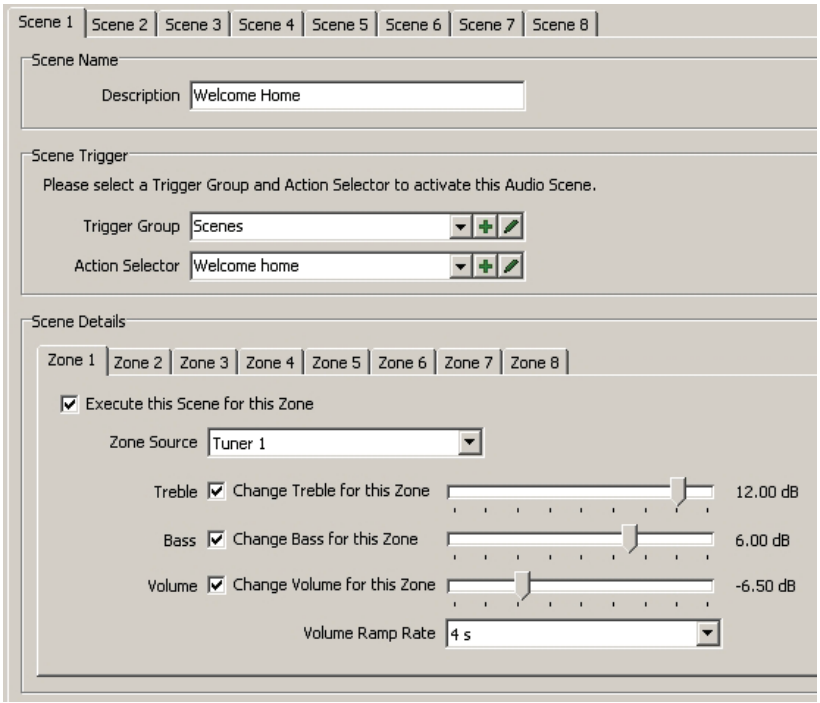
Up to four different triggers and sounds can be configured. There is also the ability to add a custom sound (using a valid WAV file) that is limited to 2 seconds. If the length of the file is greater than 2 seconds, the sound will be clipped to 2 seconds.



This example uses a trigger group called 'Doorbell' with an action selector called 'Front Door.' This set of group and action selector can be programmed into a bus coupler that can be connected to a pushbutton.

Audio Scenes Page

MRA offers the ability to create an audio scene. The configuration of this is reasonably straightforward. Typically, this scene is be triggered by an event such as disarming the security (a welcome home scene that might switch on the radio to designated areas). This feature may also be used as an alarm clock in the morning that could be triggered by a time event from a device such as a bedside touchscreen.



The Scene Name/Description is a description only and is not used other than to identify the scene's purpose by name. An action selector from a trigger group triggers the scene. It is then possible to configure which zone will be actioned by the scene. Up to 8 scenes can be configured with the ability to control volume, bass, treble and their respective levels for each zone.

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Infrared (IR) Control

MRA contains two separate IR control mechanisms:

The first is an IR repeating function where an infrared target connected to an amplifier receives an IR command passes it through the system and blasts it out of an emitter connected to the matrix switcher. This is a simple pass-through action and has no ability to control any of the functionality of the system itself.

The second is an IR blasting engine where a C-Bus command causes a preloaded IR command to be sent out of the (same) emitter connected to the matrix switcher. The IR blasting engine can be configured so that a command can be tied to control individual devices dynamically. It is possible to send different commands to different devices, based on the current source selected for a zone.

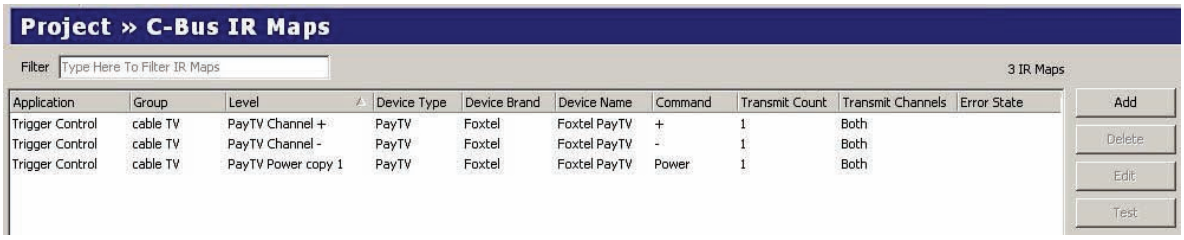
An example of this is a system that has a cable TV decoder and a CD player configured. The Next button programmed on a DLT can send a Next Track command to the CD player if the CD player is the active source and it can send a 'Next channel' command to the cable TV decoder if it is the active source.

For IR control to operate, the device being controlled needs to be loaded into the library of the system. A device in the library would typically contain all of the commands (buttons found on the remote) relevant to that device. If a device is to be controlled using the IR blasting engine, it first needs to be included in the Target IR Devices list (see below).



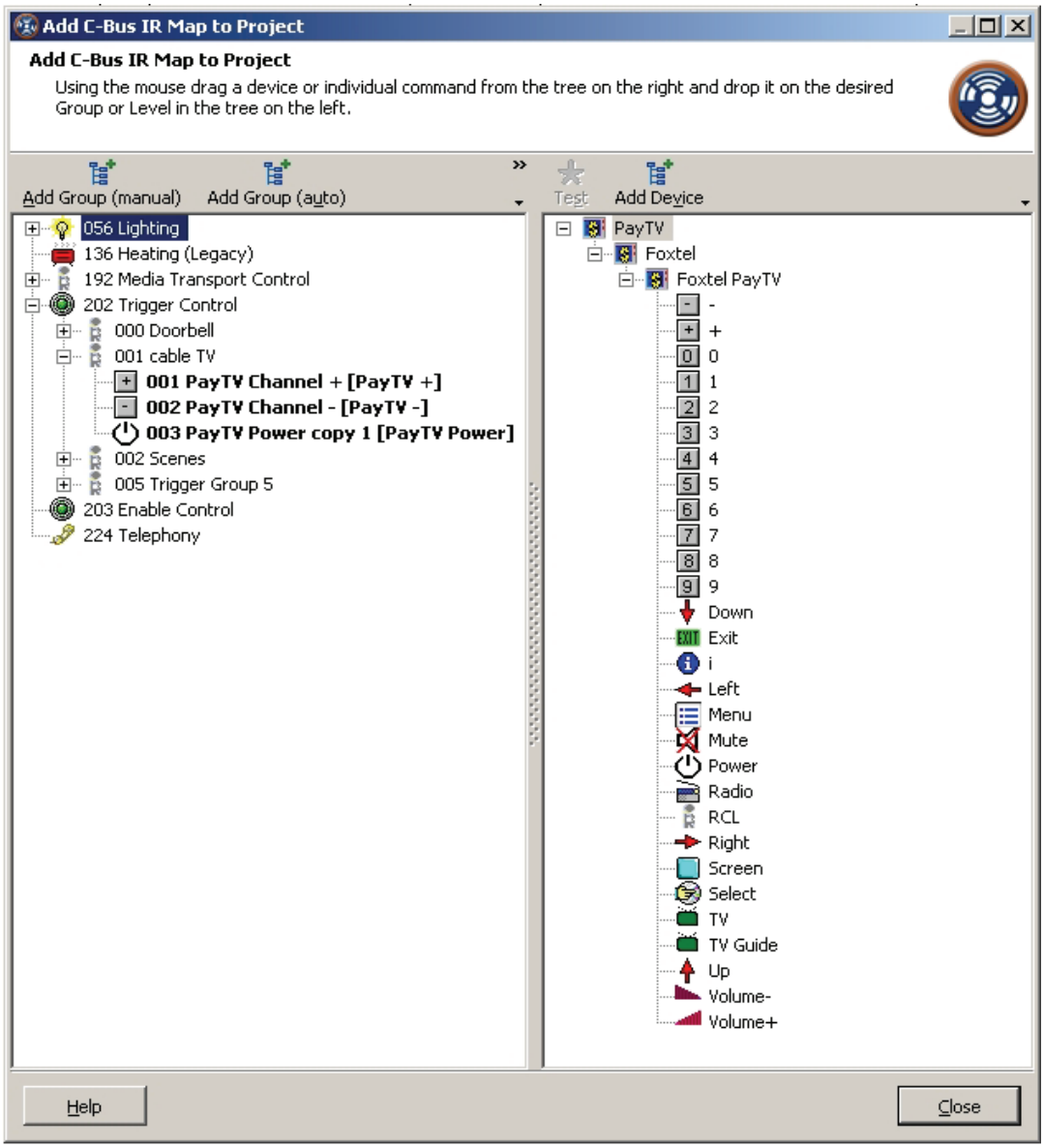
Mapping IR Commands

After an IR device has been specified and loaded, you need to specify (map) what will trigger a command to be sent. There is no requirement to map every command of the device. The IR MAP manager screen shows the currently mapped commands that are configured.



To add a new mapped command, click on the add button to bring up the add map dialogue box shown on the next page.

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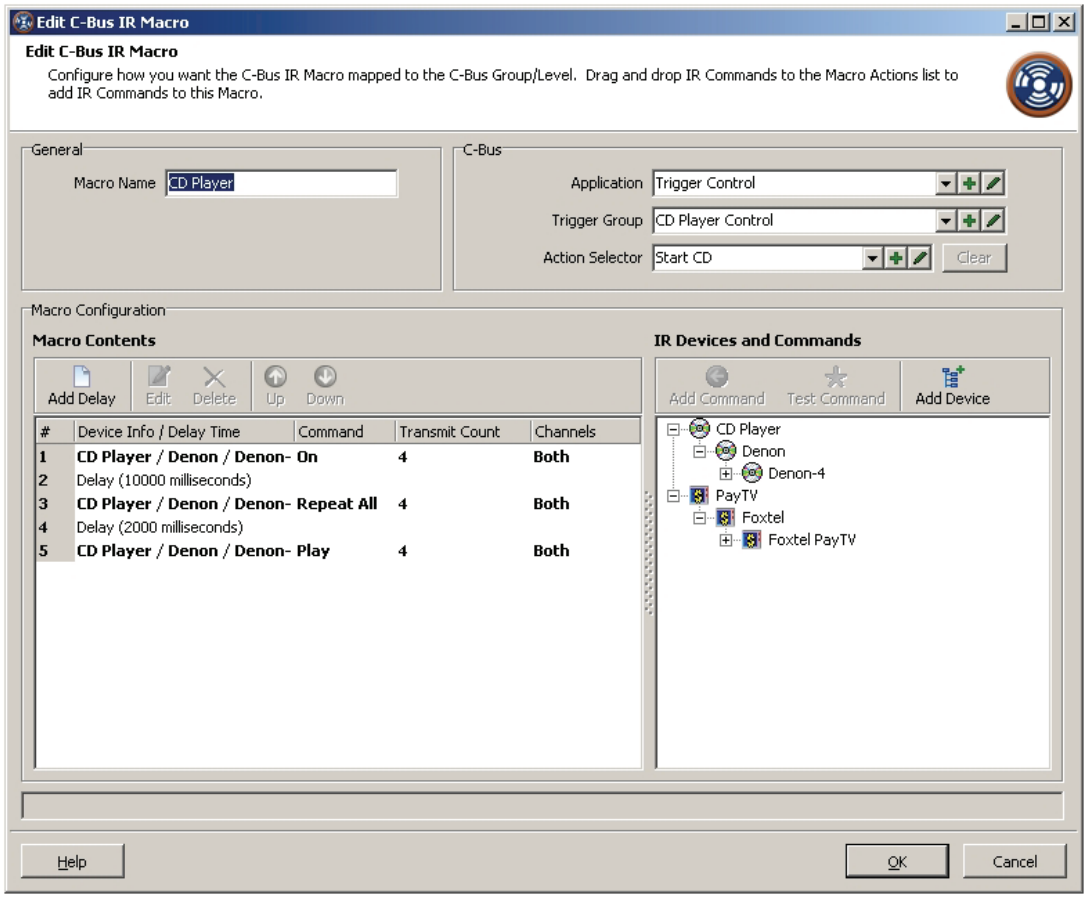


The right pane shows commands available to be mapped and the left pane shows the control groups and action selectors in C-Bus. Mapping is performed by first selecting the command on the right screen and then dragging the command and dropping it onto the group or trigger control group on the left. This association can be edited (if required) from the IR mapping menu by clicking the Edit button.

IR Macros

When using IR control, it is possible to chain together a series of IR commands to create an IR macro. A typical example of this is to switch on a CD Player, delay for a period of 10 seconds (10000 milliseconds), set the repeat function to on, delay for a further 2 seconds and then play the CD. This example is shown on the next page.

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If the infrared command you require is not in the library, a learning device is available for purchase to learn-in your own IR codes into the library.

For further assistance in using this product, consult your nearest Clipsal Integrated Systems (CIS) Sales Representative or Technical Support Officer.

clipsal.com

Technical Support email: cis.support@clipsal.com.au

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