Chapter 5: Program user controls: CC-64 and CC-16

ControlSpace Designer software allows for a great amount of flexibility in how the user will control the system. Your user control needs depend on the system design, and the needs of your customer. Your system might be a static signal processing tool, and require no user controls, or it might be a multi-room, multi-zone solution requiring both CC-64 and CC-16 controllers, along with general purpose switches and potentiometers. This chapter covers how to program the CC-64 and CC-16 controllers.

Programming overview

The CC-64 and CC-16 controllers can be programmed to control or invoke the following objects in ControlSpace Designer software:

- Gain blocks (including Input and Output blocks)
  - Grouped Gain blocks
- Selector blocks
- Parameter sets
- Certain signal processing blocks (for example crossover and EQ) using custom settings in a CC-64

Once you have established your signal processing design, programming is accomplished by dragging and dropping the object you would like to control onto the appropriate user control.

CC-64 Control Center

The CC-64 Control Center is often the primary user interface for a ControlSpace engineered sound system. The CC-64 has a logical interface that includes four rotating control knobs, a selector knob and a two line by 40 character backlit LCD display. Each knob is fully programmable, as is the LCD text display. The four control knobs can control up to four different banks, for a total of sixteen settings. Use multiple banks if you need to control more than four parameters with the control knobs. Use the Bank Selector buttons to select a different bank.

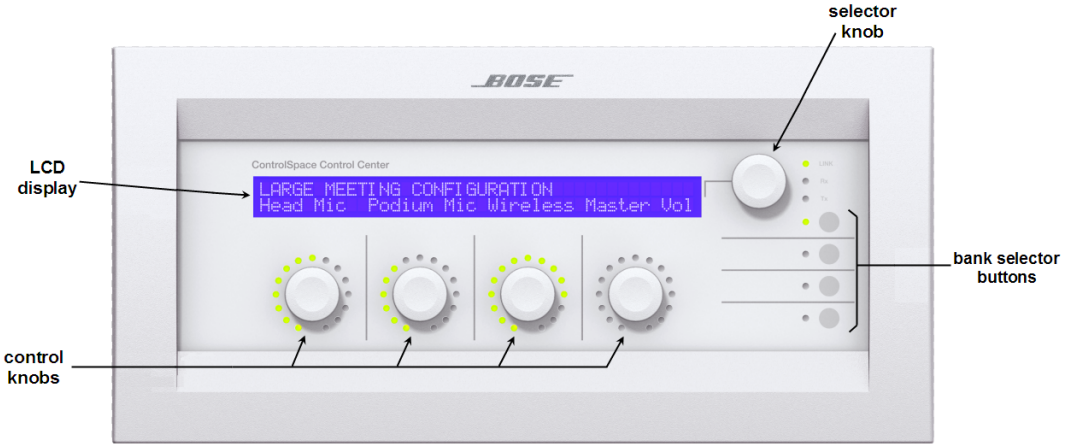

Figure 5.1 - CC-64 front panel

As shown in Figure 5.1, each control knob is surrounded by green LED lights which indicate the relative position of the control knob. The bottom line of the LCD display serves as labels for the control knobs.

Figure 5.2 - Selector knob and Bank 1control knob labels

For example, the first knob in Figure 5.2 controls the level of the Head Mic, the second knob controls the level of the Podium Mic, and so on. If you were to select Bank 2 by pressing the Bank Selector button, the four knobs might control four different volumes. The labels in the LCD screen change to indicate the knob functions in Bank 2. The top line of the LCD display indicates the parameter set that is currently being used, “Large Meeting Configuration”.

CC-64 Smart Simulator

The CC-64 Smart Simulator is used to program the CC-64 controls, as well as to simulate the behavior of the CC-64 in your system. The Smart Simulators work while on-line and off-line. To open the CC-64 Smart Simulator, double-click on the CC-64 in **Project View**.

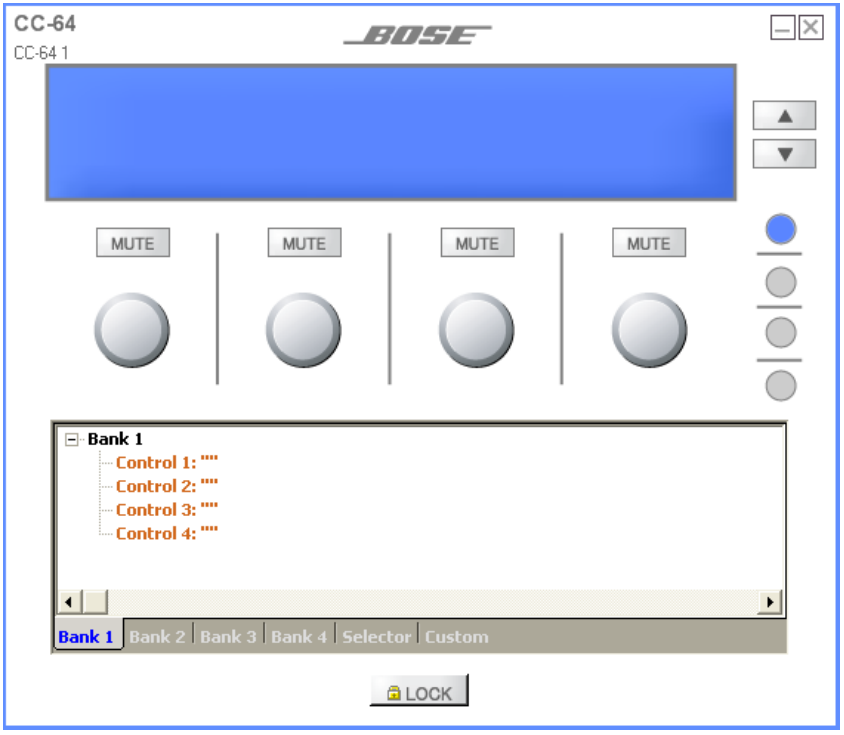

Figure 5.3 - CC-64 Smart Simulator

As shown in Figure 5.3, the top half of the Smart Simulator is a graphical representation of the front panel of the actual CC-64 controller, and the bottom half is the programming tree. Once programmed, you can operate the knobs and buttons in the Smart Simulator using your mouse. Click the **Mute** button above a control knob to simulate muting the channel.

Programming the CC-64

The programming tree in the lower half of the Smart Simulator is used for assigning functions to the controls on the CC-64. The controls on the CC-64 can be programmed with the following objects in ControlSpace Designer software:

- Program control knobs with:
    - Gain blocks (including Input and Output blocks)
    - Selector blocks
    - Groups of gain blocks
    - Parameter sets
- Program the Selector knob with:
    - Parameter sets
    - Selector blocks

When you open the Smart Simulator, the controls for Bank1 are displayed in the programming tree. You can assign functions to controls 1-4, which correspond to control knobs 1-4, by dragging and dropping from the **ESP-88** window onto the controls.

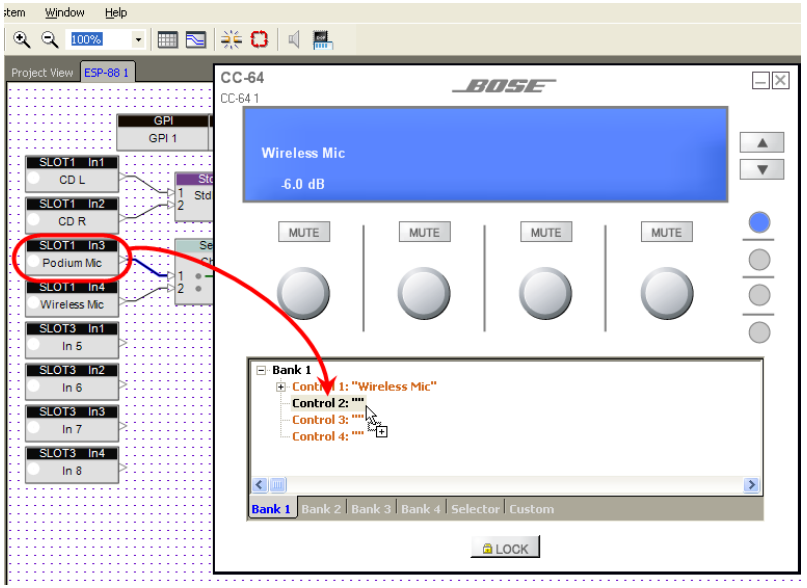

Figure 5.4 - Drag a sound processing block onto a Bank 1 control

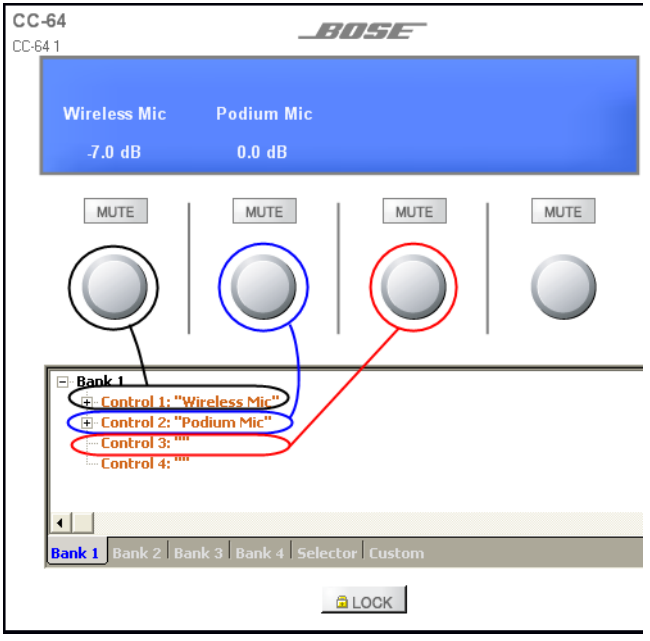

Figure 5.5 - Controls in Bank 1

To assign functions for the control knobs in Bank 2, select the **Bank 2** tab at the bottom of the Smart Simulator window or press the Bank 2 selector button (shown in Figure 5.6). Drag and drop functions onto the controls. The LCD display in the Smart Simulator shows what is displayed on the actual CC-64.

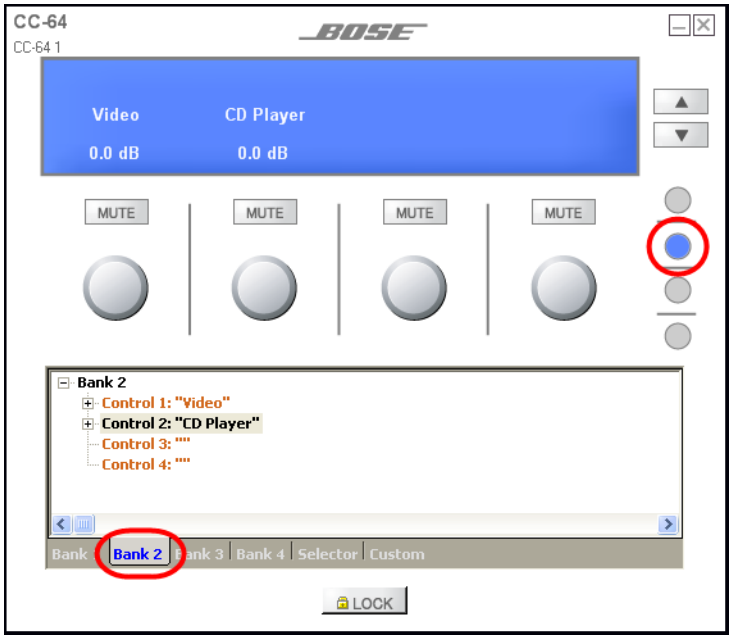

Figure 5.6 - Assign functions to Bank 2

To assign functions to the Selector knob, choose the **Selector** tab at the bottom of the Smart Simulator window. Drag and drop a Selector sound processing block, or parameter set onto the Selector.

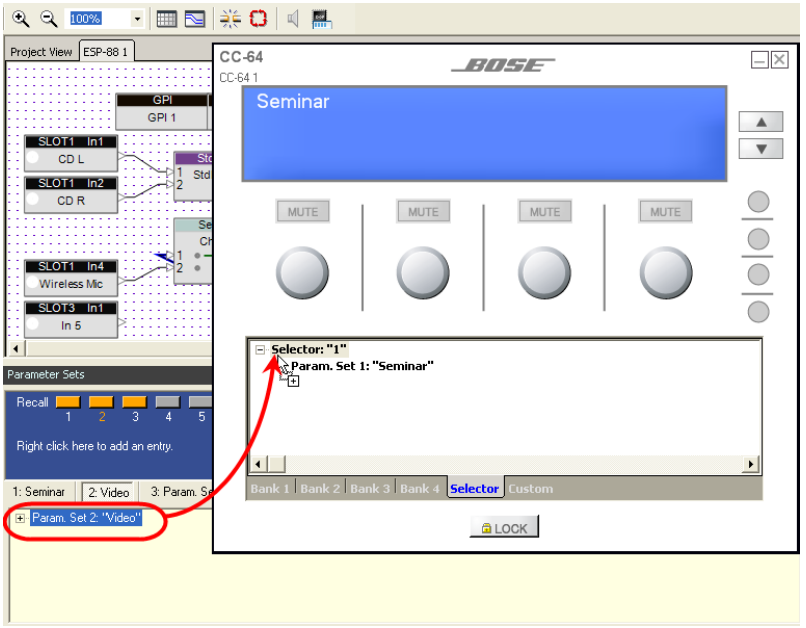

Figure 5.7 - Drag and drop a parameter set into the Selector

You can verify your programming by clicking on the Selector arrows in the Smart Simulator. You will see the display switch between the two parameter sets.

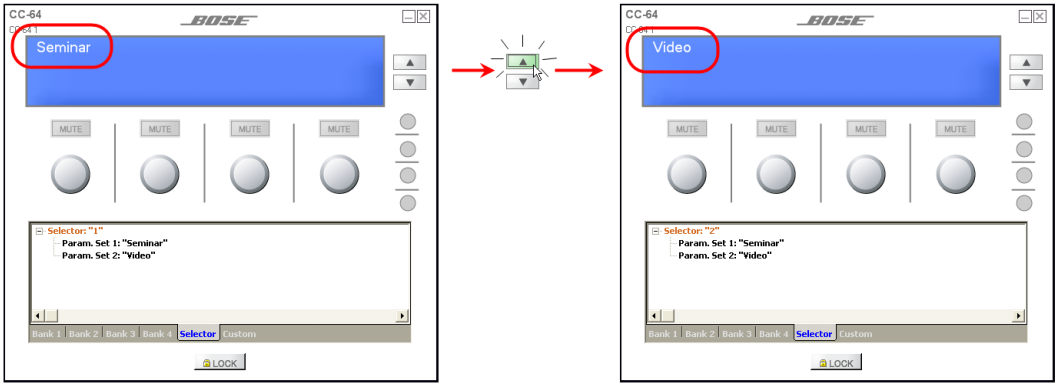

Figure 5.8 - Test the programming by switching between two parameter sets

A control knob can also act as a selector. If you program a control knob to invoke parameter sets or control a selector block, the control will change to selector arrows in the Smart Simulator:

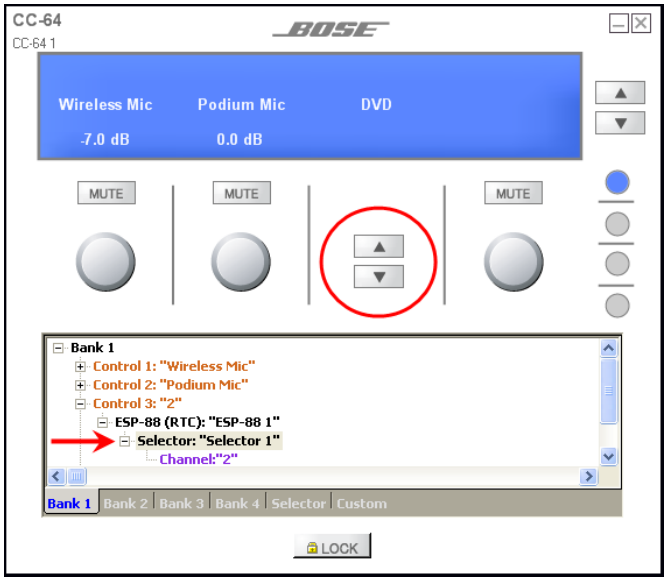

Figure 5.9 - A control knob programmed to invoke parameter sets

Custom settings

The CC-64 supports a custom mode, whereby you can access settings for certain signal processing blocks such as EQ blocks, and crossover blocks. You can program the CC-64 to control the following signal processing block types in custom mode:

- Crossover
- Graphic EQ
- Tone control EQ
- Parametric EQ
- Delay
- Signal Generator

To add signal processing blocks to the custom control, drag and drop one or more blocks listed above onto the Custom control. The Smart Simulator displays the list of blocks assigned to custom control mode.

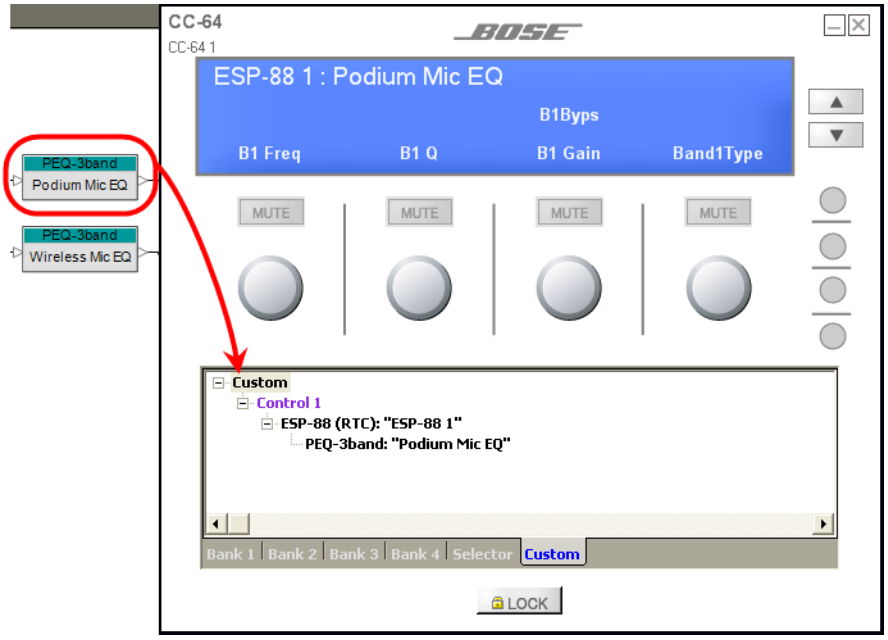

Figure 5.10 - Drag a Parametric EQ block onto a Custom control

Note: **To access the Custom controls from the CC-64 hardware, press and hold the Selector knob for 5 seconds.**

Control Properties

You can use ControlSpace Designer software to specify the maximum value, minimum value, and step size for each rotating control knob. To access control knob volume properties, right click on the **Property** line within a **Control** tree structure.

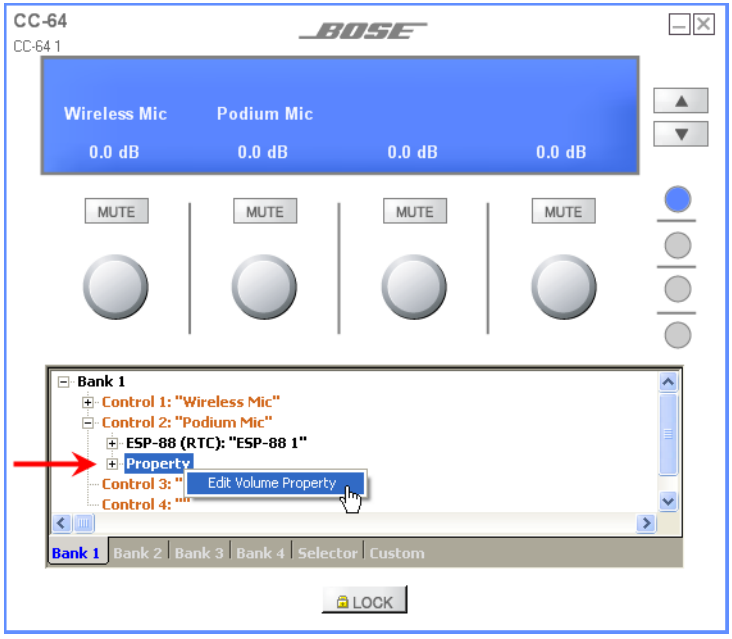

*Figure 5.11 - Right click on a **Property** to access control knob volume properties*

The volume properties dialog box opens:

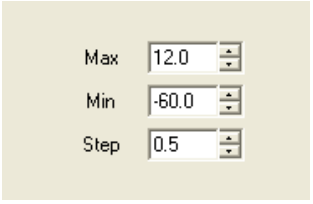

Figure 5.12 - Volume property dialog box

You can adjust the following settings:

- **Max** - The maximum volume for the control knob, in dB. Values are rounded to the nearest 0.5 dB and must be between -59.5 dB and12 dB.
- **Min** - The minimum volume for the control knob, in dB. Values are rounded to the nearest 0.5 dB and must be between -60 dB and 11.5 dB.
- **Step** - The increment of change in dB for each click as the knob is turned. Step size can be set between 0.5 dB and 36.5 dB.

There must be at least 0.5 dB between the Max and Min. You can verify your setting by turning the control knob in the CC-64 Smart Simulator. As you turn the knob, watch the LCD display to see the step size and the Max and Min volume settings.

Locking the CC-64

When the CC-64 is locked, the user controls are disabled. This is useful if, for example, you have multiple CC-64s in your system. You may require that in a certain situation the user only controls the system with one of the CC-64s. For example, during a crowded event in a function room, you do not want an accidental change of the settings on a CC-64 located in the function room. You want to control the system solely from a CC-64 in the private office. In this case you can set the CC-64 in the function room to be locked. The lock/unlock status of a CC-64 must be stored in a parameter set. When this parameter set is invoked, the CC-64 is locked or unlocked. To store the lock/unlock status in a parameter set, first set the lock button on the CC-64 Smart Simulator, then drag the CC-64 from **Project View** into a parameter set. The lock status is the only CC-64 setting that is stored in a parameter set.

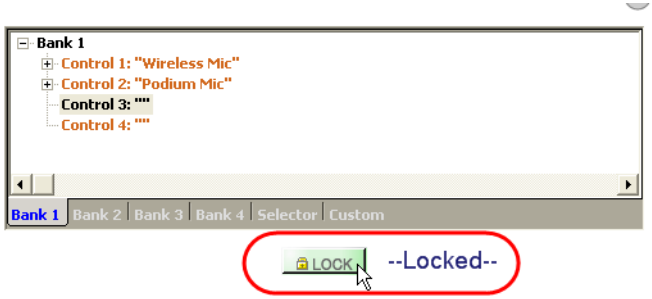

*Figure 5.13 - Press the **Lock** button to lock the CC-64*

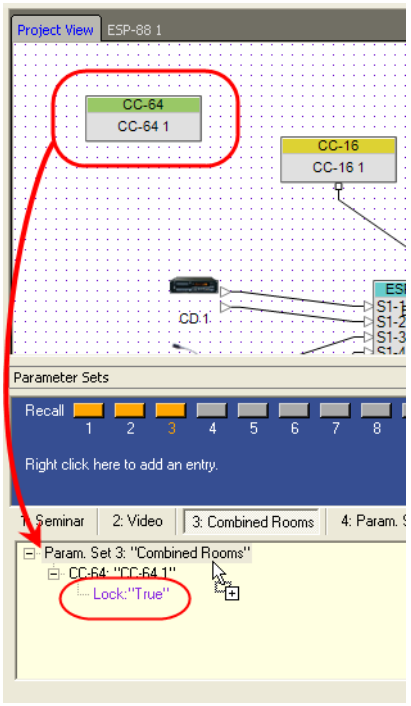

Figure 5.14 - Drag the locked CC-64 into a parameter set

If you want to change the CC-64 lock status in the parameter set, you must reset the lock and then re-drag the CC-64 into the parameter set.

Note: Be careful not to add a parameter set to a CC-64 that locks itself unless you have another user control that can unlock the CC-64. Otherwise the user can become "locked out" of the system.

CC-64 Properties

To access other CC-64 properties, right click on the CC-64 in **Project View** and select **Properties**.

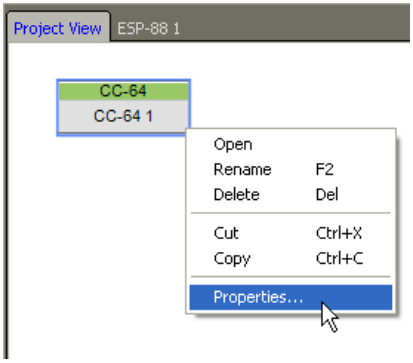

Figure 5.15 - Access CC-64 properties

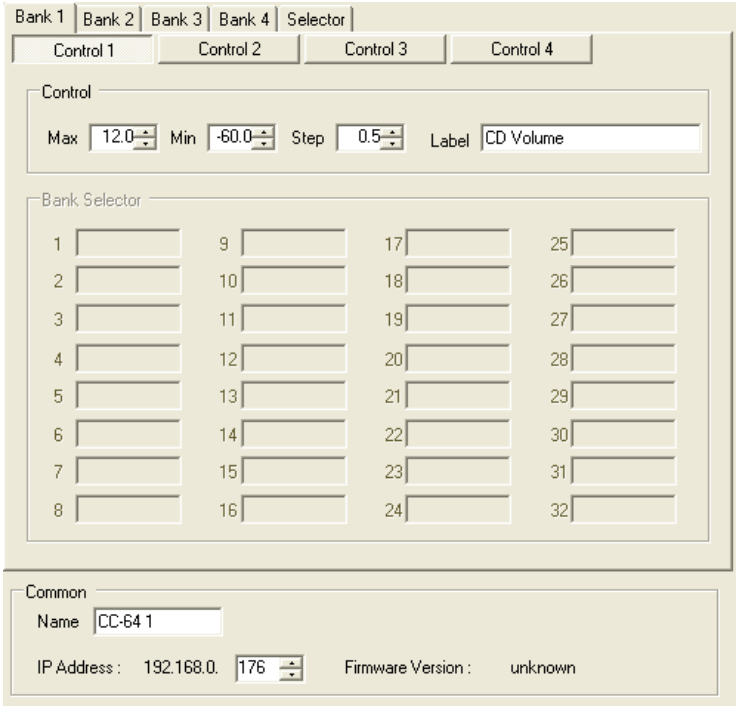

Figure 5.16 - CC-64 Properties window

You can access settings for each control knob as well as the Selector knob using the tabs at the top of the window. Press the **Control** buttons to switch between control knobs in a given bank.

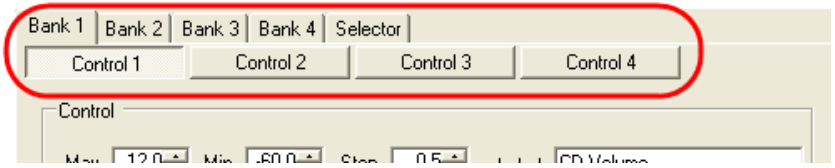

Figure 5.17 - Tabs and buttons.

You can set the max, and min levels, and step size for each control in the four banks of selector knobs.

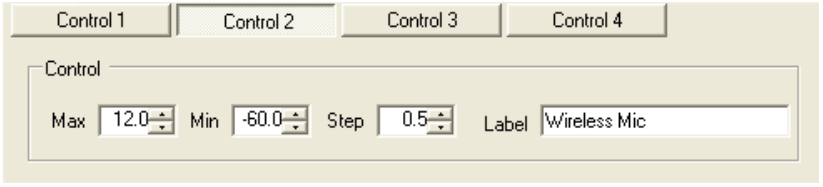

Figure 5.18 - Max, min, step size and label

You can also type in the label for the control knob in the **Label** field. This label will appear on the LCD display regardless of what the programmed control is named. For example, you may have programmed a control with “CD In”, but you want the user to see “CD Player” on the LCD screen above the control knob. You would type “CD Player” in the **Label** field.

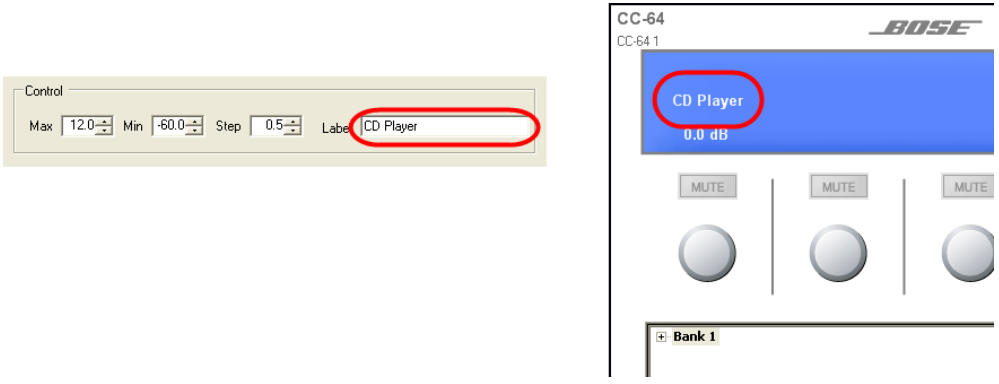

Figure 5.19 - Labeling control knobs

If you program a control knob to invoke parameter sets or control a Selector block, the **Bank Selector** fields indicate the labels that are displayed for each setting.

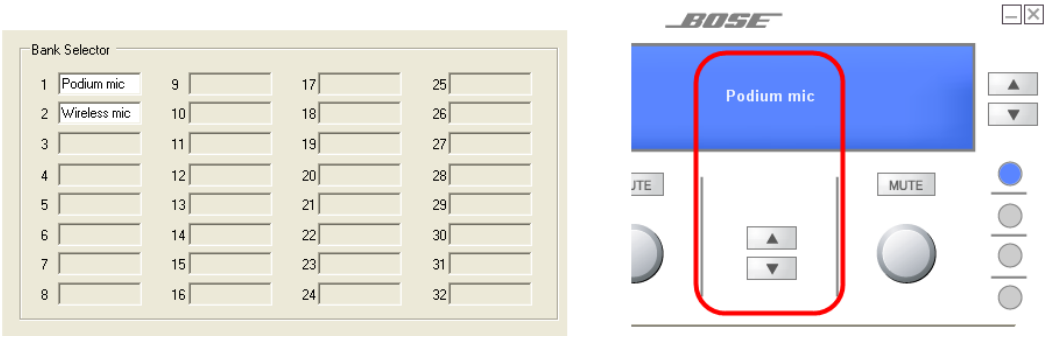

Figure 5.20 - Bank Selector fields

Select the **Selector** tab to enter the labels that are displayed for the Selector knob settings.

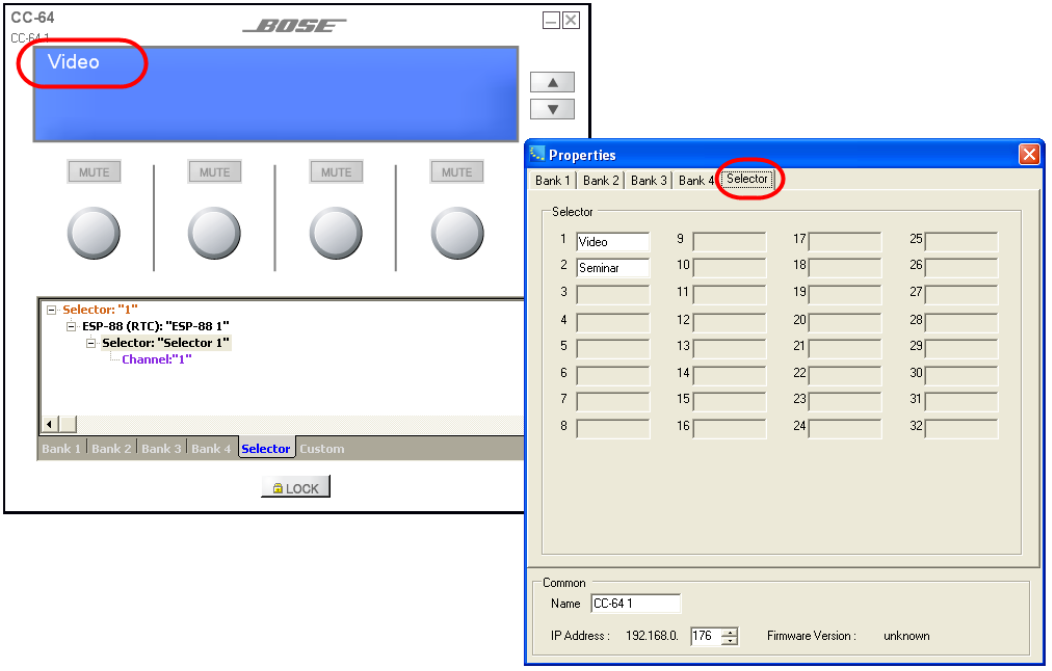

Figure 5.21 - Selector labels

The fields at the bottom of the **Properties** window are used to rename the CC-64, and to set the IP address for the CC-64 in your design.

Note: The IP address in the Properties window must match the IP address of the actual CC-64 before you upload your design.

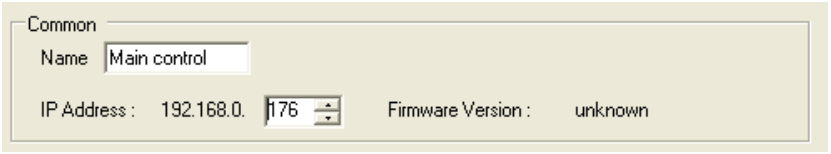

Figure 5.22 - Common settings

CC-16 Zone Controller

The CC-16 Zone Controller is a wall-mountable control panel. The CC-16 includes two selector buttons, and two volume control buttons, along with a two-line backlit LCD display. The selector and control buttons are fully programmable.

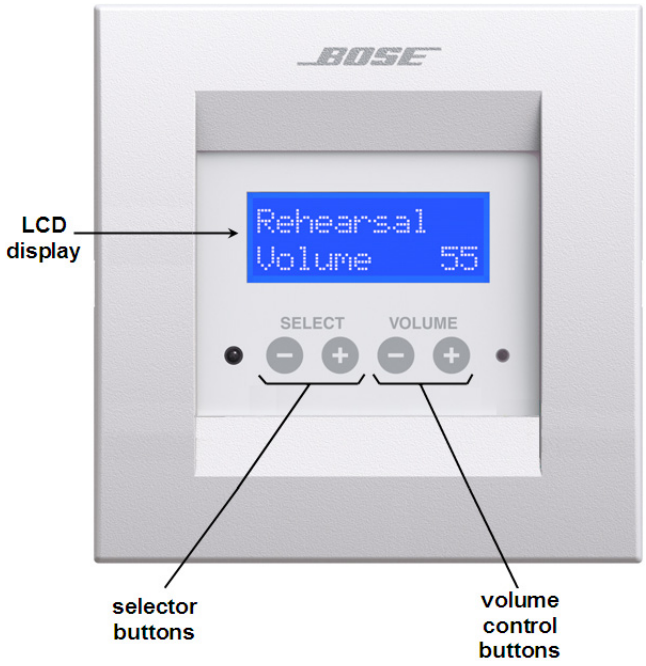

Figure 5.23 - CC-16 front panel

CC-16 Smart Simulator

The CC-16 Smart Simulator is a graphic display that simulates the CC-16 Zone Controller. You can use the Smart Simulator to program the CC-16 controls, as well as to simulate the behavior of the CC-16 in your system. To open the CC-16 Smart Simulator, double-click on the CC-16 in **Project View**.

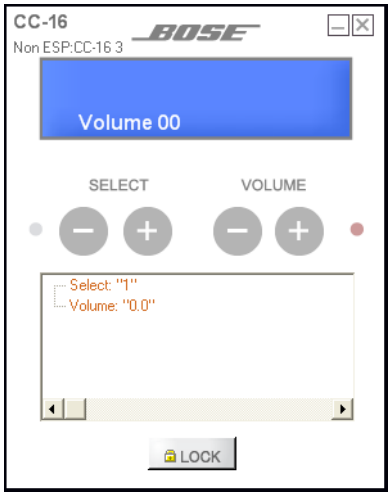

Figure 5.24 - CC-16 Smart Simulator

As shown in Figure 5.24, the top half of the Smart Simulator is a graphical representation of the front panel of the actual CC-16 controller. You can operate the selector and volume control buttons using your mouse.

Programming the CC-16

The programming tree in the lower half of the CC-16 Smart Simulator is used for assigning functions to the controls on the CC-16. Assign functions to the **Select** buttons, or to the **Volume** control buttons by dragging and dropping onto the programming tree in the Smart Simulator.

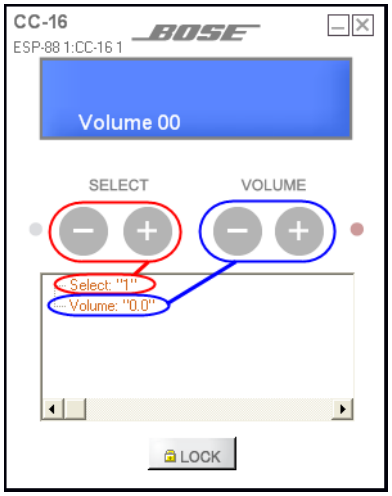

Figure 5.25 - Assign functions in the programming tree of the CC-16 Smart Simulator window

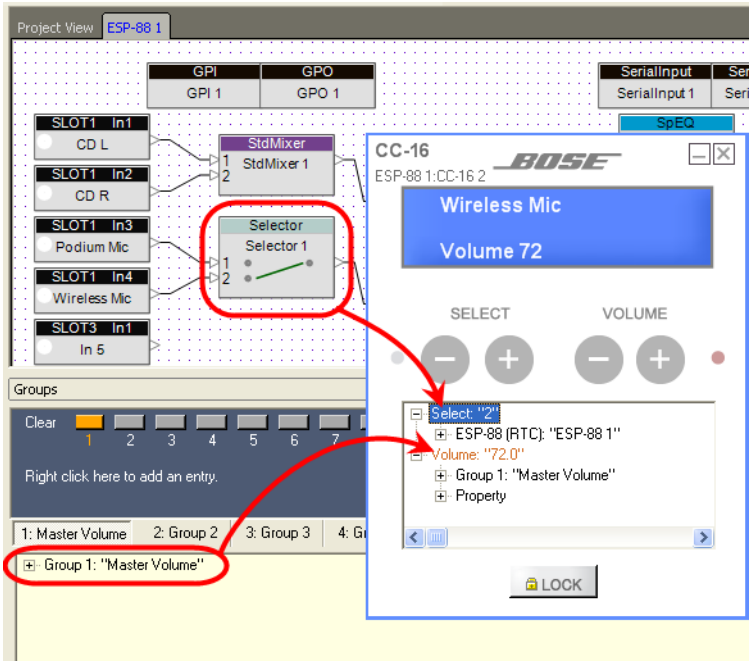

Figure 5.26 - Assigning functions to CC-16 buttons

The buttons on the CC-16 can be programmed with the following objects:

- **Select** buttons:
  - Selector blocks
  - Parameter sets
- **Volume** control buttons:
  - Gain blocks (including Input and Output blocks)
  - Groups of gain blocks

Volume control button properties

You can use ControlSpace Designer software to specify the maximum value, minimum value, and step size for the volume control buttons. The CC-16 displays volume levels from 00 (min) to 99 (max). You can specify the maximum and minimum values using the volume control button properties. To access the volume control button properties, right click on the **Property** line within the Volume programming tree.

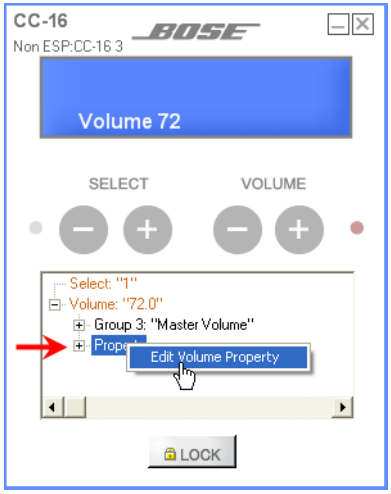

*Figure 5.27 - Right click on **Property** to access volume control properties*

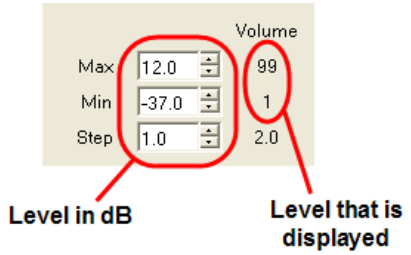

Figure 5.28 - Volume properties dialog box

Specify the Maximum volume, Minimum volume and Step size in decibel values in the boxes to the left. Step size is the incremental change in decibels each time the “+” or “-” volume button is pushed. The numbers to the right indicate what is displayed on the CC-16 LCD display. As you change the **Max**, **Min** and **Step** values in the boxes on the left, the step value is automatically updated on the right. The **Max** display value will always be 99, and the **Min** display value will always be 1 (or 0 if you set the **Min** to -infinite decibels). After setting the volume properties, use the volume control buttons on the Smart Simulator to verify what the user will see in the LCD display.

Locking the CC-16

When the CC-16 is locked, the select and volume control buttons are disabled. You might use this feature if, for example, you have multiple CC-16s in your design, and need to disable one or more for a certain configuration. Like the CC-64, The lock/unlock status of a CC-16 must be stored in a parameter set. When this parameter set is invoked, the CC-16 is locked or unlocked. To store the lock/unlock status in a parameter set, first set the lock button on the CC-16 Smart Simulator to the locked or unlocked state, then drag the CC-16 from **Project View** into a parameter set. The lock status is the only CC-16 setting that is stored in the parameter set.

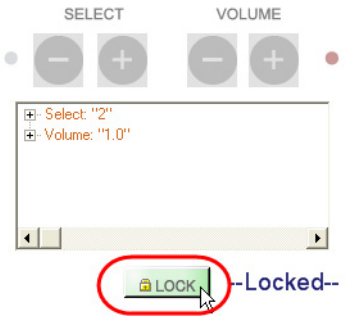

Figure 5.29 - Set the lock button on the CC-16 Smart Simulator

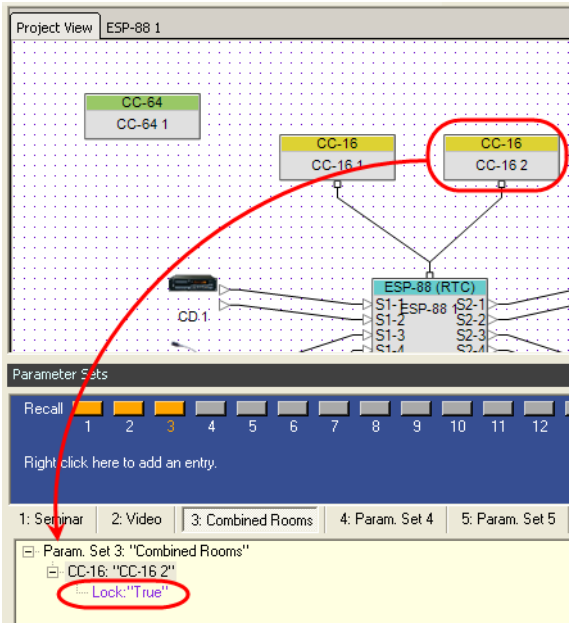

Figure 5.30 - Drag the locked CC-16 into a parameter set

If you want to change the CC-16 lock status in the parameter set, you must reset the lock and then re-drag the CC-16 into the parameter set.

CC-16 Properties

To access other CC-16 properties, right click on the CC-16 in **Project View** and select **Properties**.

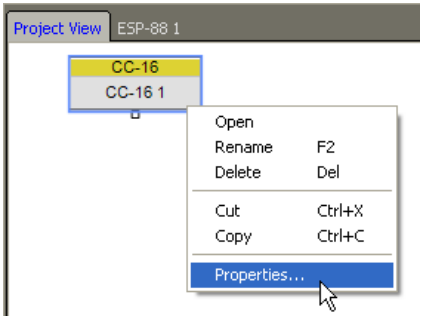

Figure 5.31 - Access CC-16 Properties

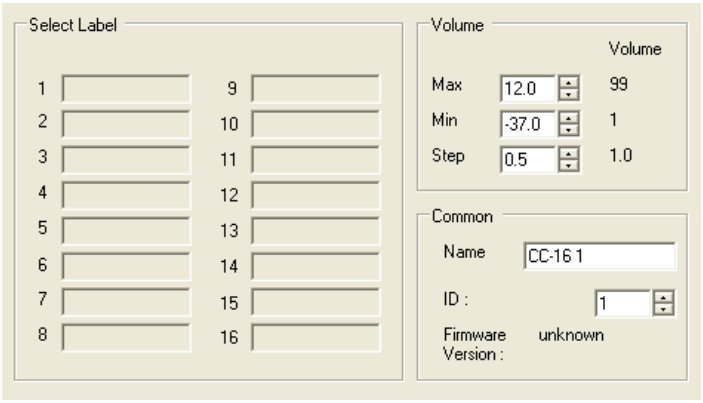

Figure 5.32 - CC-16 Properties window

After programming the **Select** buttons, you can change the text that is displayed on the LCD screen by typing in the **Select Label** fields.

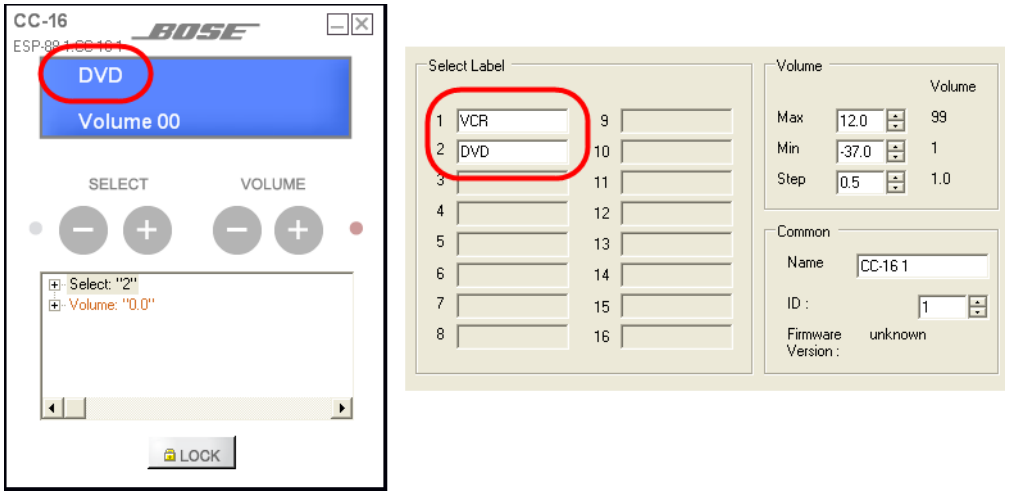

Figure 5.33 - Entering Select labels

You can set the max, and min levels, and step size for the **Volume** buttons on the CC-16 in the **Properties** window (see *Volume control button properties* above.)

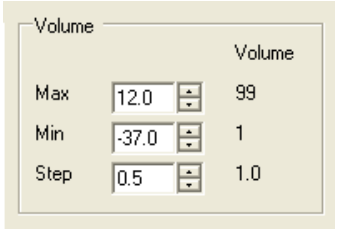

Figure 5.34 - Volume control properties

The fields at the bottom right of the **Properties** window are used to rename the CC-16, and to set the ID number for the CC-16 in your design.

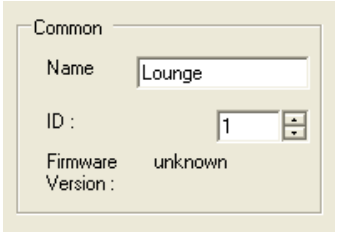

Figure 5.35 - Name and ID settings