

***RLC-6 Mode Editor***

***Link Communications  
899 Parkway Lane  
Billings, MT 59101-4652  
(406) 245-5002***

***Version 1.10 05/21/1996  
Copyright 1996 Link Communications  
All Rights Reserved***

The RLC-6 EPROM Editor uses a simple pull-down menu interface that makes using the program simple and straightforward. If you are familiar with pull-down menus you can skip the next paragraph.

#### The Pull-Down Menu Interface

The commands are arranged in a nested menu structure. Each option can be selected in one of two ways: by moving the highlight bar over the desired option and pressing return, or by pressing the appropriate hotkey. This hotkey is usually the first letter in the command. For example the Load, Edit and Save options on the main menu can be selected by pressing the 'L', 'E', and 'S' keys, respectively. The "Exit" option starts with the same letter as "Edit", so its hotkey was changed to 'X', as the capital 'X' in "eXit" suggests. A similar situation exists with the mode select menu. Pressing '0' through '7' selects the corresponding mode, although the first digit of the menu option for each is not a digit.

```
The Link Communication RLC-6 Mode Editor V1.00
```

```
Copyright (c) 1993 by Link Communications
```

```
All Rights Reserved
```

```
899 Parkway Lane  
Billings, MT 59101  
(406) 245-5002
```

```
Press 'S' for setup or any other key to continue...
```

At this point, you have two options. The first is to press the 'S' key which will allow you to choose the screen colors as shown below. The second is to press any other key to skip the setup screen.

## The Link Communications RLC-6 Mode Editor V1.00 Setup Screen

Text foreground color: LIGHTGRAY  
Text background color: BLACK  
Title foreground color: WHITE  
Title background color: BLACK  
Line/Box foreground color: CYAN  
Line/Box background color: BLACK  
Highlight bar foreground color: BLACK  
Highlight bar background color: GRAY

BLACK  
BLUE  
GREEN  
CYAN  
RED  
MAGENTA  
BROWN  
LIGHTGRAY

Save Changes to Disk [y]?

### Note:

The text background color is used to fill in all of the unused space on the screen. Even if you choose not to save the color changes to disk, they will be used for the current editing session. You will not get another chance to save colors to disk later. The default colors are shown as the selections above. They can be selected from the setup screen as shown, or if the file "COLOR.DEF" is not found, they will be selected as the defaults. 16 different colors may be chosen as the foreground color. 8 options are available for background colors.

The Link Communications RLC-6 Mode Editor V1.00  
Configuration Option Screen

Load Edit Save Delete Change Directory Load Backup eXit |

All of these operations  
affect an entire configuration  
(a complete set of information  
for programming both EPROMs)

The current configuration is UNNAMED.CFG |

This screen is the control panel of the whole program. As the subtitle "Configuration Option Screen" suggests, the commands available on this menu allow you to manage separate configurations of the RLC-6. Typically you will have the default configuration(s) which are supplied with the program, and several other configurations which you have modified. Typically the new program user will load the default configuration, look at it, change a few things, and use the Save, Save To menu options to save the modified version to a new name. If one desires to start from scratch rather than modifying the default configuration, after running the program, no configuration is loaded from disk; instead the blank configuration called UNNAMED.CFG is just modified and saved to a new name.

The Link Communications RLC-6 Mode Editor V1.00  
Configuration Option Screen

Load Edit Save Delete Change Directory Load Backup eXit |

MYMODE.CFG  
DEFAULT.CFG  
TEST1.CFG

All of these operations  
affect an entire configuration  
(a complete set of information  
for programming both EPROMs)

The current configuration is UNNAMED.CFG |

This shows all of the files in the current directory with the extension "CFG" and the correct file length. You should highlight the file you wish to load and press <return>. If you wish to load a backup file, select the "Load Backup" option. It is conceivable that a file that was not originally from the EPROM editor would have the correct extension and size and show up as an option. Loading such a file from a different source may cause an error or it may just load in gibberish.

The Link Communications RLC-6 Mode Editor V1.00  
Configuration Menu

Please specify your linking and audio options  
and your PTT polarities before choosing Edit Modes.

Edit Modes

Linking - Hub or Chain: Hub  
Audio - Voted or Mixed: Voted  
Link 0 PTT Active Level: Low  
Link 1 PTT Active Level: Low  
Link 2 PTT Active Level: Low  
Link 3 PTT Active Level: Low  
Save Options to Disk

After selecting the "Edit" option from the configuration option screen, you will be presented with the screen shown above. The first thing you should do is to select the linking and audio mode you intend to use on your RLC-6. These are determined by jumpers on the RLC-6 main board and are typically set as desired and left. There is a separate set of eight modes for each of the four combinations, so changing mode #1 with linking mode set to hub will not affect mode #1 with linking mode set to chain. The audio mode works the same way. If you know which linking and audio modes you plan to use, there is no reason to edit modes #1 through #8 for any other combination of linking and audio modes. The PTT active levels only take effect when you actually write the binary file to be loaded into the eprom. They can be changed at any time before that file is written. If you want the audio and linking modes and PTT active levels to be saved for the next time you run the program, use the "Save Options to Disk" option and they will be loaded automatically the next time you run the program.

The Link Communications RLC-6 Mode Editor V1.00  
Mode Selection Menu

Please select the mode you would like to edit.

Active USR Lines

Edit Mode #0  
Edit Mode #1  
Edit Mode #2  
Edit Mode #3  
Edit Mode #4  
Edit Mode #5  
Edit Mode #6  
Edit Mode #7

.	.	.
.	.	x
.	x	.
.	x	x
x	.	.
x	.	x
x	x	.
x	x	x

Modes #0 through #7 represent the eight different combinations of the lines (Out1..Out3) that are normally connected to output lines of a controller. The active level of these lines is ground (active low) - they are pulled up by resistors inside the RLC-6 if they are not being pulled low by a controller or other method. If a controller is not being used and all of the Out lines are left floating high, Mode #0 will always be used by the RLC-6. A user would typically select their audio and linking modes in the previous screen, then define these eight modes that could be selected by the controller (by changing the three USR lines).

# The Link Communications RLC-6 Mode Editor V1.00

Configuration: UNNAMED.CFG      Mode: 1      Audio: Mixed      Linking: Hub

Active COR Inputs				Audio Output Connected To				Active PTT Outputs			
0	1	2	3	0	1	2	3	0	1	2	3
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	x	.	.	.	.	.	.	.	.
.	.	x	.	.	.	.	.	.	.	.	.
.	.	x	x	.	.	.	.	.	.	.	.
.	x	.	.	.	.	.	.	.	.	.	.
.	x	.	x	.	.	.	.	.	.	.	.
.	x	x	.	.	.	.	.	.	.	.	.
.	x	x	x	.	.	.	.	.	.	.	.
x	.	.	.	.	.	.	.	.	.	.	.
x	.	.	x	.	.	.	.	.	.	.	.
x	.	x	.	.	.	.	.	.	.	.	.
x	.	x	x	.	.	.	.	.	.	.	.
x	x	.	.	.	.	.	.	.	.	.	.
x	x	.	x	.	.	.	.	.	.	.	.
x	x	x	.	.	.	.	.	.	.	.	.
x	x	x	x	.	.	.	.	.	.	.	.

Press 'H' to see description of available commands  
Press <ESC> when through editing this mode

This is the actual editing screen. It allows you to change one mode for one combination of linking and audio modes. At the top, the current configuration, mode number and linking and audio modes are displayed for reference (they are chosen in the previous screens). A block cursor should appear in the upper left corner of the editing area, showing you where your changes will take place. If it is not visible, see the manual section on the Setup Screen to select new colors. Each row in the area below contains three types of information. The four columns on the left labeled "Active COR Inputs" represent the 16 different combinations of the four COR inputs that could be active at any one time. One way to think of the first row, for example, is, "If none of the ports are keyed up, what do I want the RLC-6 to do?" The second row shows an 'x' in column three under "Active COR Inputs," meaning "What do I want the RLC-6 to do if only link 3 is keyed up?" There are 16 rows containing every possible combination of active COR inputs. You get to choose what you want done in each situation. The next four columns labeled "Audio Output Connected To" identify what audio source will be connected to each transmitter. By pressing the spacebar (or using one of the shortcuts explained in the help screen below), you can choose which, if any, receiver's audio will be transmitted out each port. Note that a different audio source can be chosen for each port for each combination of active COR inputs. This makes the RLC-6 extremely flexible.



The audio sources you can choose from are (the main port is also called port 0):

main	- output the audio that is being received on the main port
link 1	- output the audio that is being received on link 1
link 2	- output the audio that is being received on link 2
link 3	- output the audio that is being received on link 3
mix	- output all of the active audio sources mixed together
tx/cw	- output the audio from the external audio input
off	- turn the audio output for that port off (signified as a dot on the screen)

When you select an audio source, you will notice that an 'x' appears in one of the "Active PTT Outputs" columns on the right. This signifies that when the combination of COR inputs shown on the left of the row is active, the PTT signals for the ports marked with an 'x' on the right will be asserted. The audio that will go out of each port is shown in the middle. It is not possible (because it would be worthless) to activate a PTT output without choosing a audio source, or to choose an audio source without activating a PTT.

You can see a summary of the commands that are available from this screen while executing the program by pressing the 'H' key for help. This help screen and longer descriptions follow.

```

                                     Description of Available Commands

Please Note:  Port 0 is the Main Port

Cursor Control:  <arrow keys> <home> <end> <page up> <page down>

Commands Available Anywhere On the Editing Screen:
  <space>        Cycle through available options
  U              Undo All Changes to the Current Mode
  <delete>       Reset Line (turn all audio and PTT options off)
  <insert>       Copy Last Line Deleted To Current Line

Commands Affecting Audio Outputs:
  0..3          Select Numbered Port as Audio Source
  M or 4        Select Mixed Audio Source
  E, X or 5     Select External Audio Source
  O or 6        Turn Audio Off

                                     Press any key to continue editing...
```

Every option can be selected with only the arrow keys and the spacebar, so don't worry about memorizing all of these commands. They have been included to speed up editing as much as possible, but are not at all necessary. Most of the commands affect only the location identified by the block cursor, others affect the whole line or entire screen. Detailed descriptions follow.

<arrow keys> - the arrow keys work just as you would expect them to. If you are using the numeric keypad to move around, make sure Num Lock is off. <home> - Moves the cursor to the left edge <end> - Moves the cursor to the right edge <page up> - Moves the cursor to the top row <page down> - Moves the cursor to the

bottom row<space> - Cycle through all available options: select the audio source or toggle the PTT on and off  
U - Undo All Changes to the Current Mode. This command restores the current mode to the exact state it was in before you began editing. It is not reversible. <delete> - This command does two things. First it copies the current line (the line the block cursor is on) into a buffer (see <insert> below for more information). It then turns all of the audio sources and PTT outputs off. <insert> - This command copies the contents of the buffer (see <delete> above) to the current line. It does not change the contents of the buffer. If the delete command is used accidentally, pressing insert will undelete that line. Along with the <delete> command, whole lines can be moved or copied at once. To move a line, first delete it then insert it in the desired position. To copy a line, delete it, insert it right where it came from, then move to another line and insert it again, copying the first line.  
0..3 - These commands select the corresponding port as the audio source. It should be noted that '0' is used interchangeably with "main" to denote the main port on the RLC-6.

M or 4 - Select Mixed Audio Source. Similar to the above. This option can be selected by pressing either the 'M' or the '4' key. E, X or 5 - Select External Audio Source. Same as above for the external audio source. O or 6 - Turn Audio Off. Tells the RLC-6 not to connect any audio source to the audio output selected by the block cursor.

The Link Communications RLC-6 Mode Editor V1.00  
Configuration Option Screen

Load Edit Save Delete Change Directory Load Backup eXit |

Backup  
Replace  
Save To  
Write Eprom Programmer File

All of these operations  
affect an entire configuration  
(a complete set of information  
for programming both EPROMs)

The current configuration is UNNAMED.CFG |

This screen shows the options available for saving the current configuration.

Backup renames the old file on the disk (if it exists) to the same name but with the extension ".BAK". These backup files can be loaded with the "Load Backup" option on the main menu. It then saves the configuration from memory to disk with the name shown in the box at the bottom of the screen as "The current configuration is:".

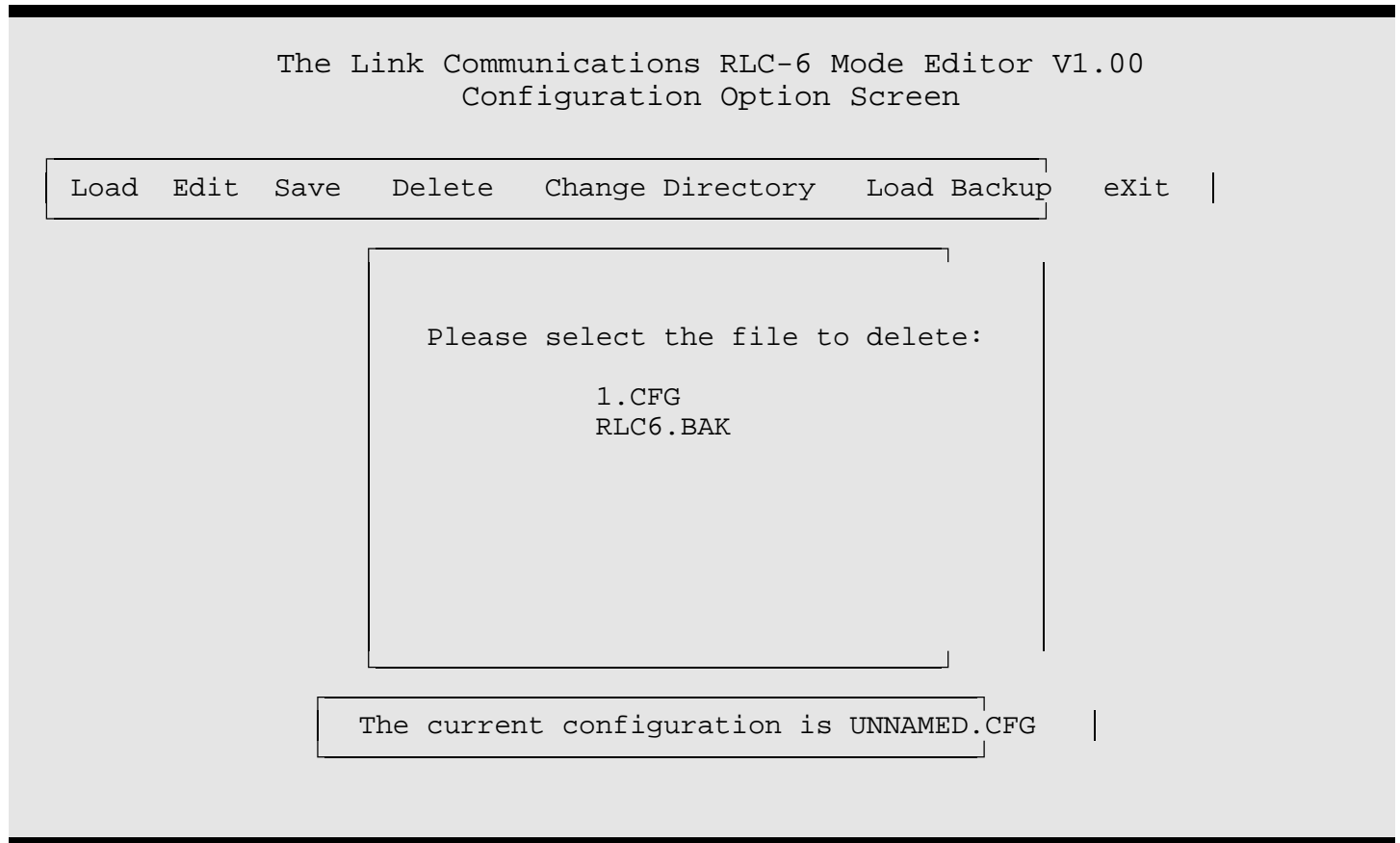
Replace saves the configuration from memory to disk under the name shown at the bottom of the screen as the "current configuration".

Save To changes the name of current configuration then saves the configuration from memory to disk under the new name. If you choose a name that is already present on the disk, it could be overwritten. The program is intended to warn you of such a situation and allow you to choose a new name, but you alone are responsible for choosing filenames that do not cause loss of data.

"Write EPROM programmer file" translates the configuration from memory into a bitmap for the EPROMS and writes it to the disk. This can take a while, so please be patient. The filenames used are the configuration name with the extensions ".PR1" and ".PR2" for EPROM #1 and EPROM #2, respectively. These can be loaded as binary files by any standard EPROM programmer. You should use an offset of 0 and program a 2732 EPROM with the data from the files you just wrote: "filename.PR1" and "filename.PR2". Remember to keep track of which EPROM is #1 and which is #2; swapping them will not hurt either the EPROMS or the RLC-6, but the RLC-6 will not work as expected. When putting your new EPROMS into the RLC-6, turn the power off, remember to ground yourself so that you do not damage anything with static electricity, and remove

the old prompts carefully. The location for EPROM #1 is labeled 2732A-1 and the location for EPROM #2 is labeled 2732A-2 on the circuit board itself.

Note that the "Write Eprom Programmer File" command does not save the configuration from memory to disk in the "filename.CFG" format so that it can be edited later - and you will get nowhere trying to edit the ".PR1" or ".PR2" files. You should always use the Backup, Save, or Save To commands to save the configuration as a ".CFG" file before writing the EPROM files or exiting the program, so you don't lose the ability to take up where you left off later. Link Communications is not responsible for any possible loss of your data files, regardless of whether "it was the program's fault" or not.



Choosing the Delete command from the main menu presents you with a screen similar to that shown above. It allows you to delete any files in the current directory with the extensions ".CFG" or ".BAK". This is useful for getting rid of old configuration files or their backups. DELETING A FILE IS NOT MEANT TO BE REVERSIBLE, however if you do accidentally delete a file you wanted, immediately try to use MSDOS's (version 5 or later) undelete command or a similar file undelete utility.

LINK COMMUNICATIONS IS NOT RESPONSIBLE FOR YOU DELETING YOUR FILES.

The Link Communications RLC-6 Mode Editor V1.00  
Configuration Option Screen

Load Edit Save Delete Change Directory Load Backup eXit |

Please enter the new directory: |

All of these operations  
affect an entire configuration  
(a complete set of information  
for programming both EPROMs) |

The current configuration is UNNAMED.CFG |

This shows the screen as it looks after selecting the Change Directory option. It is useful for loading configuration files from a different directory than you executed the program from, or saving them to another location. Please note that any files that are saved after changing the directory will go to the new location. To save to a different drive, include the drive letter in the path (example: "A:\DIR\"). The trailing backslash is optional.

The Link Communications RLC-6 Mode Editor V1.00  
Configuration Option Screen

Load Edit Save Delete Change Directory Load Backup eXit |

RLC6.BAK

All of these operations  
affect an entire configuration  
(a complete set of information  
for programming both EPROMs)

The current configuration is UNNAMED.CFG |

This shows all of the files in the current directory with the extension "BAK" and the correct file length, whether or not they are originally from the EPROM editor. Loading a file from a different source may cause an error or it may just load in gibberish. You should highlight the file you wish to load and press <return>. It is recommended that when you save a file you loaded as a backup, that you use the "Save To" command to change it's name to a ".CFG" file so that you don't accidentally erase it thinking it is outdated and so that saving the ".CFG" file by the same name with the "Backup" option will not save over it.

The Link Communications RLC-6 Mode Editor V1.00  
Configuration Option Screen

Load Edit Save Delete Change Directory Load Backup eXit |

Current file not saved!!!

Save and Exit  
Exit Without Saving  
Do Not Exit

All of these operations  
affect an entire configuration  
(a complete set of information  
for programming both EPROMs)

The current configuration is UNNAMED.CFG |

This is the screen you will see if you choose the "eXit" option and you haven't saved the current configuration since it was last modified. The Link Communications RLC-6 Mode Editor is intended to keep track of whether or not the current configuration has been modified since it was saved last so that it can remind you, but you are ultimately responsible to make sure that your data is saved. If you attempt to exit and the current configuration has been saved since it was last modified, the program will exit immediately. If it has been modified since it was saved last, the screen shown above will be displayed to give you a chance to save if you wish.

The Link Communications RLC-6 Mode Editor V1.00  
Configuration Option Screen

Load Edit Save Delete Change Directory Load Backup eXit |

Are you sure you want to exit [y]? |

All of these operations  
affect an entire configuration  
(a complete set of information  
for programming both EPROMs) |

The current configuration is UNNAMED.CFG |

Pressing <esc> almost anywhere in the program allows you to quit whatever you are doing, and in some cases return to the previous menu. However, if you are already in the main menu, there is nothing to back up to, except to exit the program. If you have not saved the current configuration since it was last modified, you will be presented with a menu like the one described immediately above. If you have saved since making the last modification, you will be prompted as shown above, just to make sure you meant to exit the program.



APPENDIX A: MODE SELECTION

Mode Selection with Out1..Out3.

Note: 'x' implies that the corresponding line is pulled LOW.  
'.' implies that the corresponding line is HIGH.  
(all inputs are pulled high internal to the RLC-6, so the active state is LOW).

Out3...Out1				Out3...Out1			
3	2	1		3	2	1	
.	.	.	Mode 0	H	H	H	
.	.	x	Mode 1	H	H	L	
.	x	.	Mode 2	H	L	H	
.	x	x	Mode 3	H	L	L	
x	.	.	Mode 4	L	H	H	
x	.	x	Mode 5	L	H	L	
x	x	.	Mode 6	L	L	H	
x	x	x	Mode 7	L	L	L	
3	2	1		3	2	1	

As you might guess, it is possible to operate the RLC-6 without hooking up all three control lines (Out1..Out3), although some loss of flexibility will result. If no control lines are hooked up, they will all be pulled high by the internal pull-up resistors, selecting mode 0. If only Out1 is hooked up, mode 0 will correspond with Out1 high and mode 1 with Out1 pulled low, just as the chart above shows. The number of modes available versus the number of control lines is shown below.

Number of Mode Select Pins	Range Of Modes Selectable
0	Mode 1 Only
1	1 through 2
2	1 through 4
3	1 through 8

APPENDIX B: THEORY OF OPERATION

The RLC-6 is not a computer - it is controlled by a simple look-up table. Each of the inputs shown in the table below goes to one of the address lines of the EPROM (Erasable Programmable Read Only Memory). Because there are 12 input lines, each with two possible states (high or low), there are 2^12 or 4096 possible combinations (addresses). For each address there are 16 bits of memory (8 per EPROM) that are reflected as 16 output lines from the EPROMS. These outputs control which audio sources are connected to each output and which PTT outputs are active. What this program does is provide a convenient way to select which outputs of the EPROMS will be turned on for each combination of inputs.

### Inputs to the RLC-6's EPROMS:

The binary weights of the various inputs to the eeproms are:

Input	Power of 2
out1	0 mode select line #1
out2	1 mode select line #2
out3	2 mode select line #3
corm	3 called cor0 elsewhere
v/m	4
h/c	5
cor1	6
cor2	7
cor3	8
usr1	9
usr2	10
usr3	11

Note - this software assumes that usr1, 2, and 3 are always high. Therefore the first 7/8 or 3584 of the 4096 bytes of the eeprom file are meaningless (they are set to 0).

### Outputs of the RLC-6 EPROMS:

s2, s1, s0 = c, b, a - main audio out source select  
s5, s4, s3 = c, b, a - link 1 audio out source select  
s8, s7, s6 = c, b, a - link 2 audio out source select  
s11, s10, s9 = c, b, a - link 3 audio out source select  
s12 - PTT Main  
s13 - PTT Link 1  
s14 - PTT Link 2  
s15 - PTT Link 3

Where the audio outputs are determined by the following:

The binary weights of c, b, and a are c = 4, b = 2, a = 1.

The available audio sources are:

0 = main  
1 = link 1  
2 = link 2  
3 = link 3  
4 = mix  
5 = tx/cw  
6 = mute  
7 = mute

## APPENDIX C: THE AUDIO AND LINKING MODE JUMPERS

Before this program was created so the user could define their own modes, each RLC-6 came preconfigured with a different set of Modes #0 through #7 for each of the four combinations of linking and audio modes. By selecting their linking and audio modes with the on-board dip-switches, they could select the appropriate set of modes #0 through #7. However, there is nothing in the RLC-6's hardware that makes one combination of switch settings specific to either type of linking or audio. Therefore, it is possible to set up four different sets of modes #0 through #7, and select between them with the switches on the RLC-6. The user is normally instructed to use them as separate linking and audio modes because that is how the default configuration is set up and to avoid confusion.