Utah Scientific

Field Bulletin

Tie Line Configuration

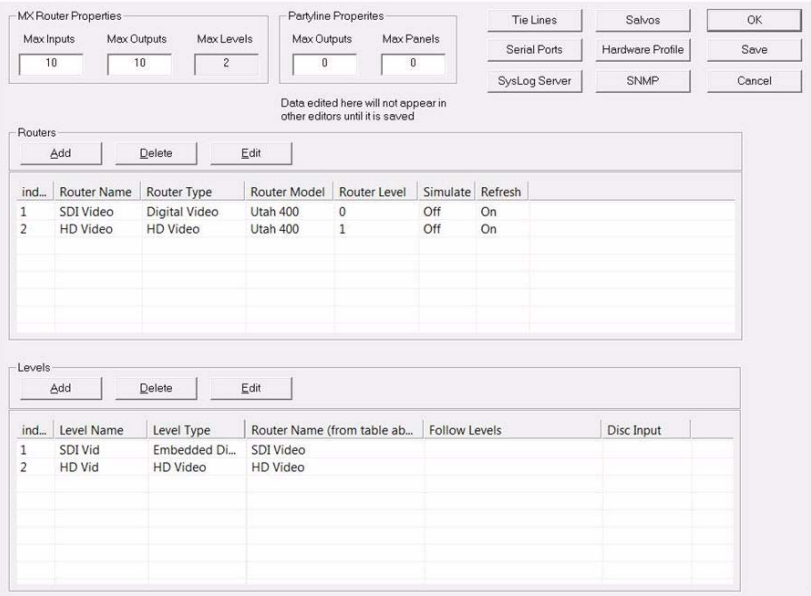
Roadmap to Tie Line Success

Tielines are an advanced topic related to ‘Router Configuration and System Design’. The user should have a thorough working knowledge of the U-CON V4 system, and routers in general, before attempting to design and implement tielines in a router control system.

Router configuration

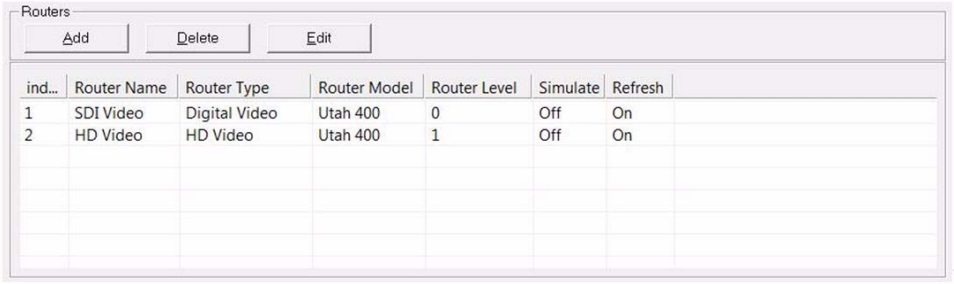
Begin by configuring basic router control; including the SC-4 or SC-400 controller, router size, number of signal levels, router hardware, and logical router levels. If tielines are being added to an already existing system, then simply make sure that there are two distinct levels created that will use the tielines. Note: In order to use tielines there must be two levels created of which the tielines will pass between. These may come from a single router or from different physical routers, but in either case there must be two levels created in order for the tielines to function properly.

1. Open the configuration table by double clicking on the SC4/SC400 icon on the ‘System’ screen. The following is an example of a simple 10x10 router. If the router and level tables are already created and working then click the button titled ‘Tie Lines’ and proceed to the section below titled ‘Tieline Creation’. If not, then proceed with step 2.

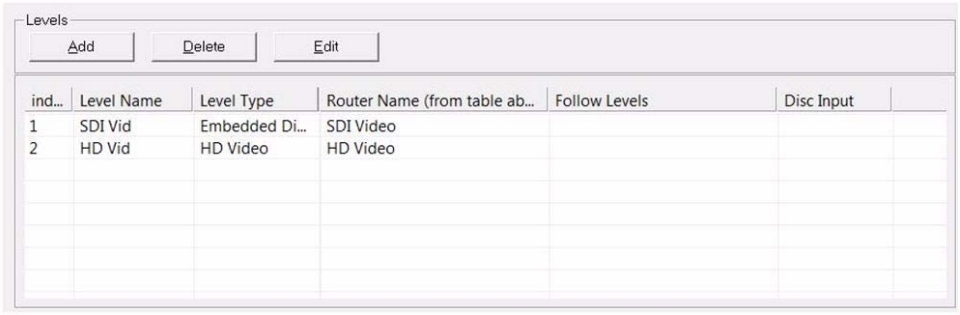


2. Enter the maximum number of inputs and outputs that the largest router type is capable of expanding to in the upper left windows on the screen above titled ‘MX Router Properties’.

3. To add physical routers, click the ‘Add’ button in the middle section titled ‘Routers’. Enter the desired names and router levels in the appropriate windows. Router levels are offset by one. i.g. Level 1 would use as 0 for the entry. Make sure ‘Refresh’ is on for all. Click ‘OK’ to exit.



4. After completing step 3, click the ‘Add’ button on the lower table titled ‘Levels’ and enter the levels and other items in the appropriate windows. The example below shows two levels already created. One for SDI and the other for HD. Click ‘OK’ to exit this screen.



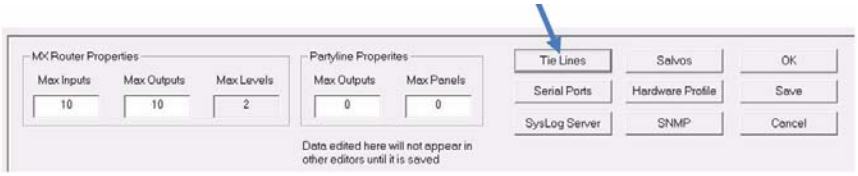
5. Click ‘OK’ on the properties screen to exit and go back to the ‘System’ screen. Click ‘File’ from the drop down menu at the top of UCON and then click ‘Save’.

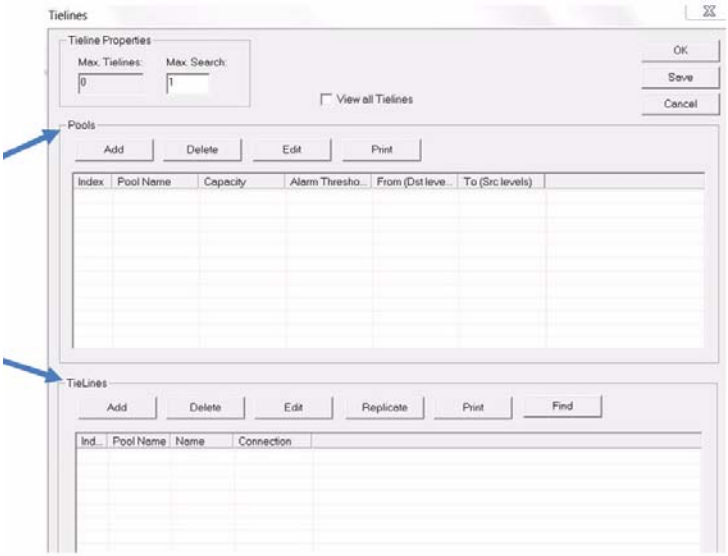
Configuring Tielines

There are four parts to building and using tielines successfully. First, there must be tie pools created. These are basically groups of tielines, such as up or down converter tielines, of which each would have their own pool. Second is the table within the pool where tielines are built. Third, is to assign from the source table, desired sources to be used as tielines. And fourth, is the destination table, where selections of destinations are made, as to which ones will be able to use the tielines.

1. From the ‘System’ screen, double click the SC4 icon to open the properties window.

2. Click on the button titled ‘Tie Lines’ as seen below, and a window will open showing both the tie pools and the tielines assigned to those pools.





3. To create the desired tie pools, click on the ‘Add’ button in the upper half of the tieline properties window. When the following window opens, enter the desired name for this pool, the capacity number (which is the number of tielines to be used in this pool) and a threshold number (which is the same as the tielines or less – used in rMan software for managing tielines). Then check the router level box from which the tielines will be coming from (Dst Levels) and then check the router level box to where the tielines will go into (Src levels).

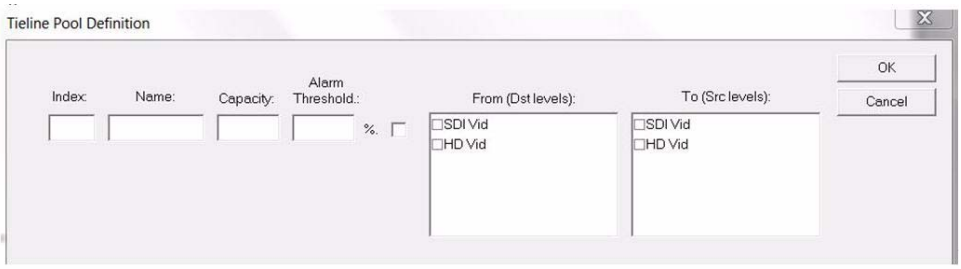


FIGURE 1. Empty Tie Pool

FIGURE 2. Defined Tie Pool

4. Once these items are filled in, click ‘OK’ and then create any other pools using the previous steps

5. Next, click on the desired tie pool in the upper table and then click on the ‘Add’ button in the lower table titled ‘Tielines’. Enter desired name for this tieline and then either click the ‘Find’ button, allowing the system to use the first open source and destination that is not found in the source or destination tables and that falls within the MX router size that was built above, or simply type the router numbers into the table manually. Remember, these numbers cannot exist on the source or destination table.

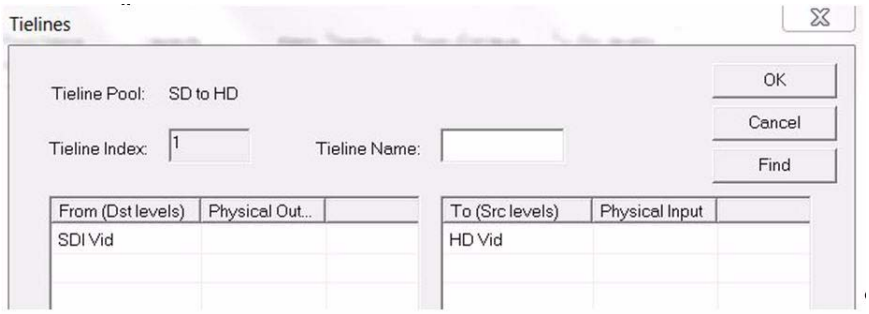


FIGURE 3. Empty Tieline Table

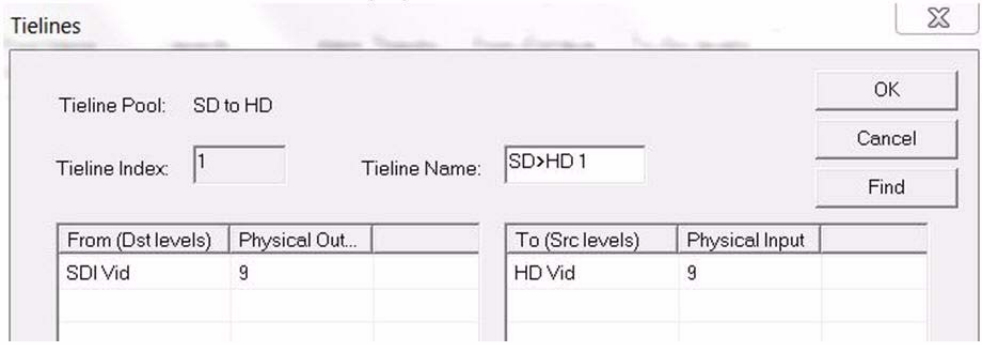


FIGURE 4. Defined Tieline Table

6. Build as many tielines, using the steps above, as needed for each pool, according to the capacity number in each pool. The figure below is an example of two pools, each with a capacity of 2 and with two tielines defined in each.

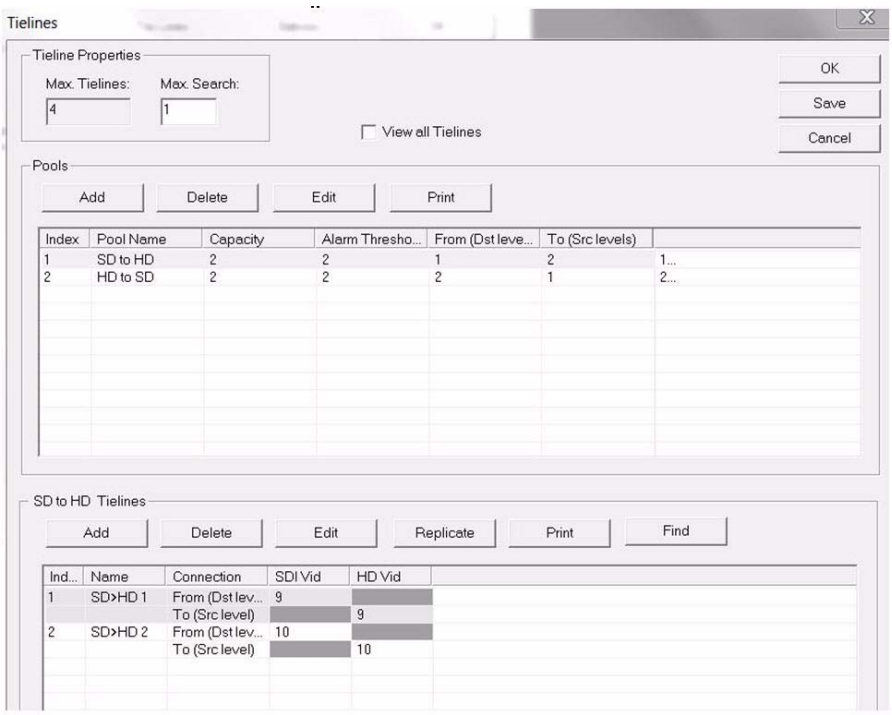


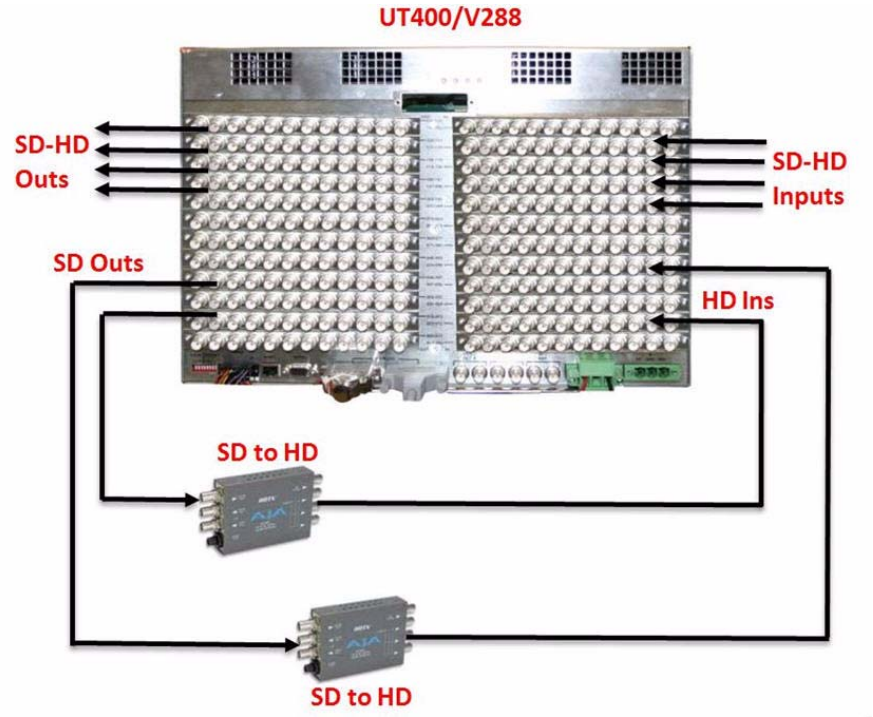
FIGURE 5. Pools and Tielines Defined

7. Once these tables are complete, click the ‘Save’ button and then the ‘OK’ button in the ‘Tieline Properties’ window. Then click the ‘Save’ and ‘OK’ buttons on the router properties window.

8. While at the ‘System’ view, save your work to the pc by clicking on ‘File’ at the top menu and then click the ‘Save’ menu item.

Note: This data will still need to be programmed into the SC4/SC400 before it will take effect in the system. However, there is no need to program the changes until the source and destination tables have been defined for tieline use. There will be a step in the next section for sending the data to the controller and any panels that will be used for switching tielines.

Configuring Sources and Destinations



The next step is to configure sources and destinations. If this is not already completed, then add inputs and outputs for both levels that tielines will be using, by referring to the section titled 'Adding and Editing Sources and Destinations' in this Ucon manual. Note: in order to use tielines, the physical router numbers that will be used for these tielines, cannot be in the tables. These physical numbers will be added to the tieline configuration table in the SC4 properties.

1. Once the source and destination tables are defined, the next thing to do is to decide which inputs may be used to pass through the tielines. Example – if the system is to take SD sources in and upconvert to HD destinations, then which of all of the SD sources that go to the router, will be capable of going to HD destinations? The same thing goes for sources that are HD and will be passing through tielines, then through down converters and on to destinations that are SD.

2. With step one decided, open the source table by clicking the tab at the bottom of the system screen titled ‘Sources’.

3. With the source table open as seen in the next figure below, either click on a single row or use the control or shift keys to block groups of rows. Then click the ‘Edit’ button to the right to open the editor.

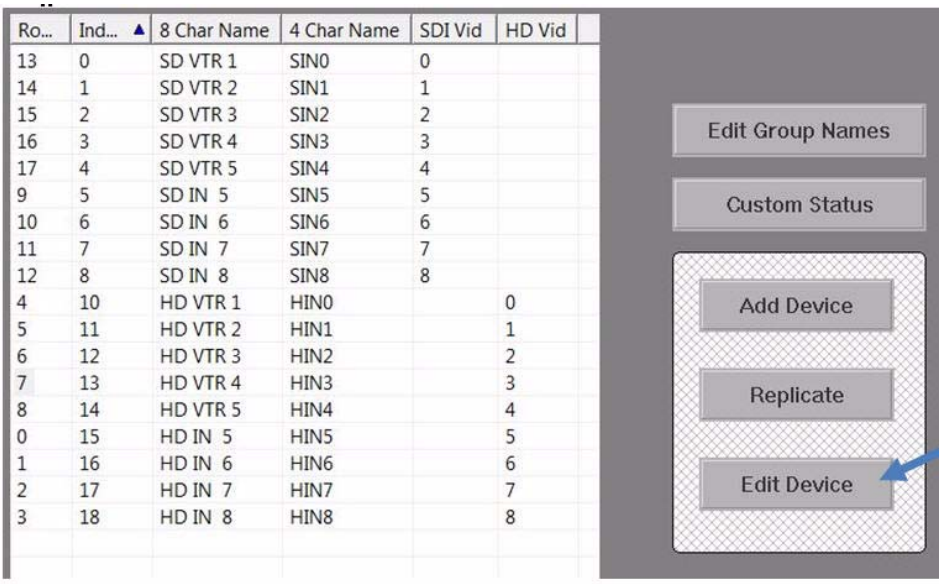
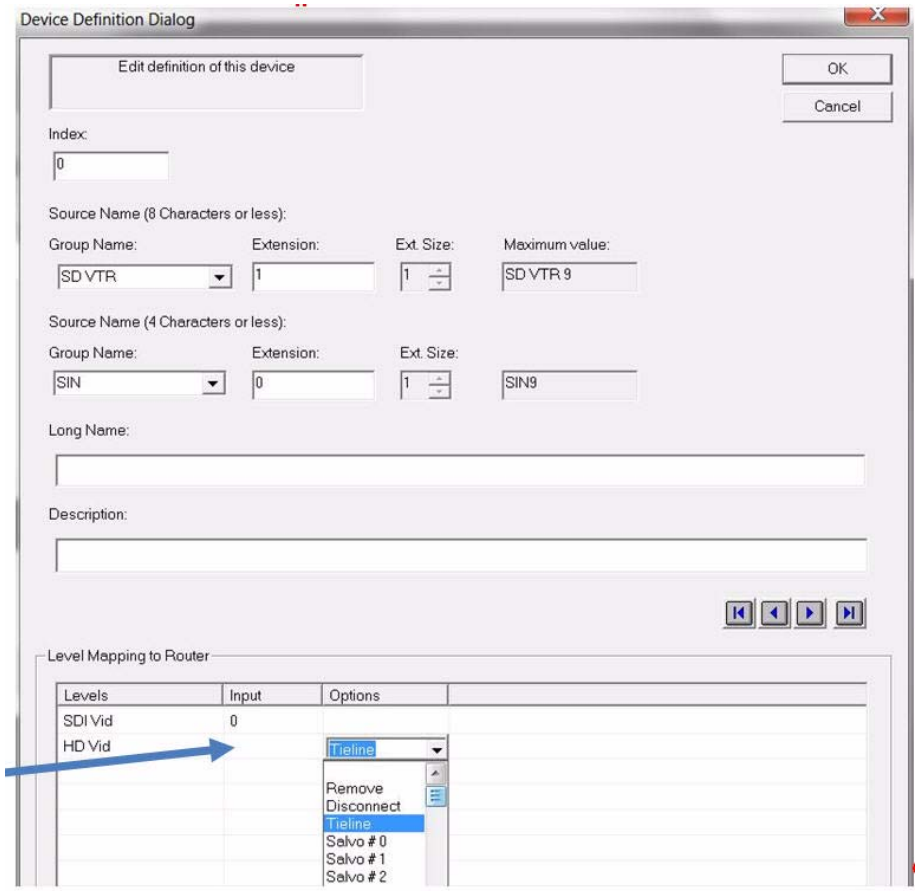


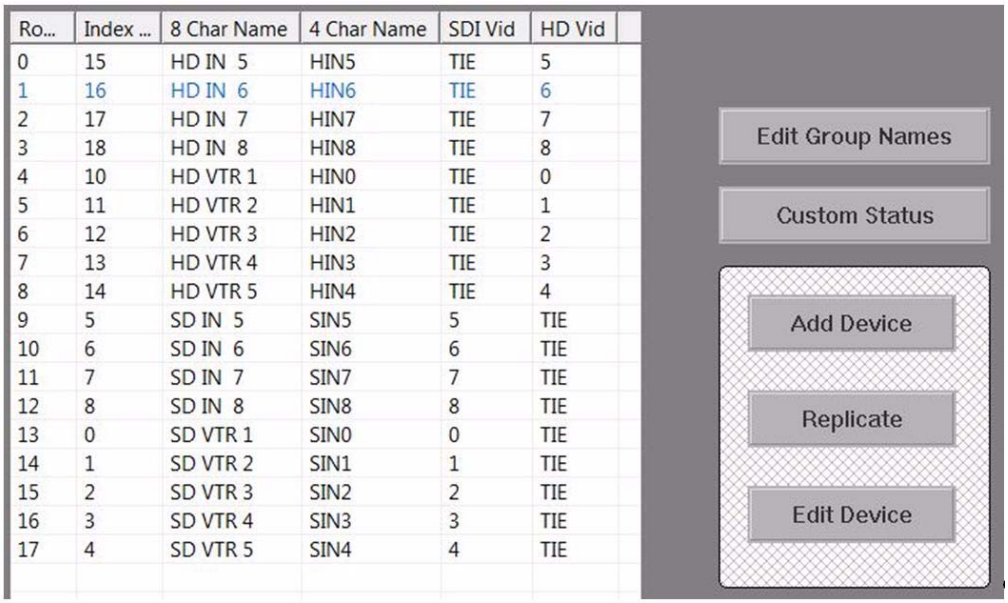
FIGURE 6. Source Table With No Tielines

4. Once the source editor is open, go down to the ‘Level Mapping to Router’ section and drop down the arrow in the correct level and click the word ‘Tieline’.

Note: To know which level to put the tieline in, it should be the level that does not have a number in the ‘Input’ column on that table, as seen by the arrow below.



5. Click ‘OK’ when this is complete and repeat for all sources that will require a tieline. The next figure shows an example of all tielines in the HD and SD levels. After all tielines are entered in the table, click the ‘Save’ button to get back to the system screen.



Ro...	Index ...	8 Char Name	4 Char Name	SDI Vid	HD Vid
0	15	HD IN 5	HIN5	TIE	5
1	16	HD IN 6	HIN6	TIE	6
2	17	HD IN 7	HIN7	TIE	7
3	18	HD IN 8	HIN8	TIE	8
4	10	HD VTR 1	HIN0	TIE	0
5	11	HD VTR 2	HIN1	TIE	1
6	12	HD VTR 3	HIN2	TIE	2
7	13	HD VTR 4	HIN3	TIE	3
8	14	HD VTR 5	HIN4	TIE	4
9	5	SD IN 5	SIN5	5	TIE
10	6	SD IN 6	SIN6	6	TIE
11	7	SD IN 7	SIN7	7	TIE
12	8	SD IN 8	SIN8	8	TIE
13	0	SD VTR 1	SIN0	0	TIE
14	1	SD VTR 2	SIN1	1	TIE
15	2	SD VTR 3	SIN2	2	TIE
16	3	SD VTR 4	SIN3	3	TIE
17	4	SD VTR 5	SIN4	4	TIE

FIGURE 7. Source Table with Tielines Assigned

6. Open the destination table by clicking on the ‘Destinations’ tab at the bottom of the system screen.

7. With the destination table open as seen in the next figure below, determine which outputs will be used to switch tieline sources to and either click on a single row or use the control or shift keys to block groups of rows. Then click the ‘Edit’ button to the right to open the editor.

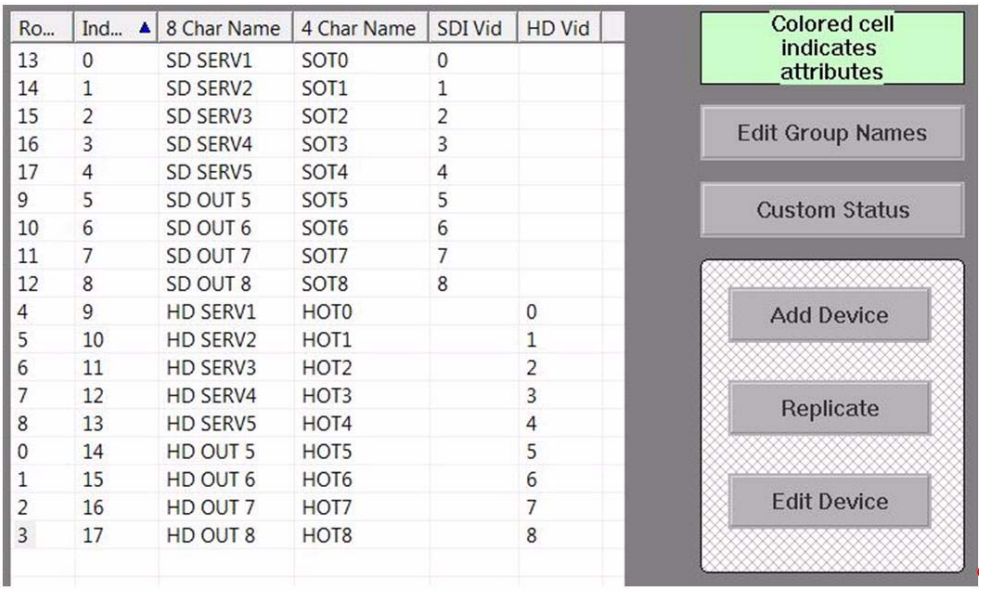


FIGURE 8. Destination Table without Tielines Assigned

8. Once the destination editor is open, click on the option arrow for the level in the lower table titled ‘Level Mapping to Router’ and select the tieline option such as ‘SD to HD’ or ‘HD to SD’. The correct level would be the one that has no entries in the destination level as indicated by the arrow shown below.

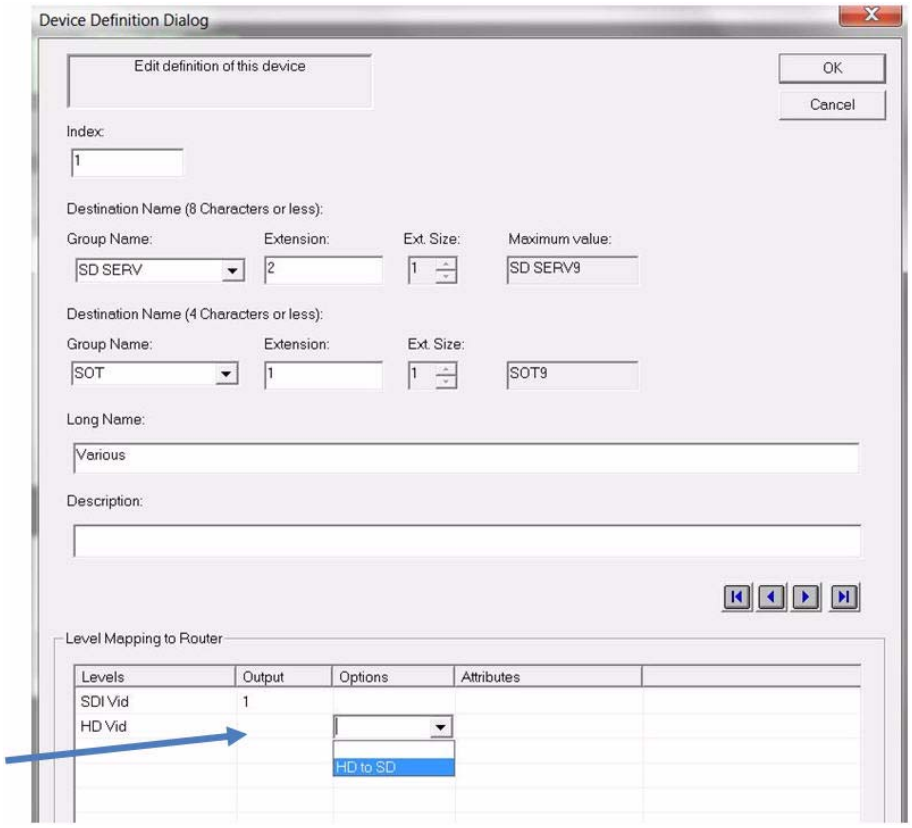


FIGURE 9. Destination Editor – with HD to SD Tieline Selected

9. Click ‘OK’ when this is complete and repeat for all destinations that will require a tieline. The next figure shows an example of all destinations in the HD and SD levels. These will appear grayed out, which is the only indication that there is a tieline assigned. After all destinations are entered in the table, click the ‘Save’ button to get back to the system screen.

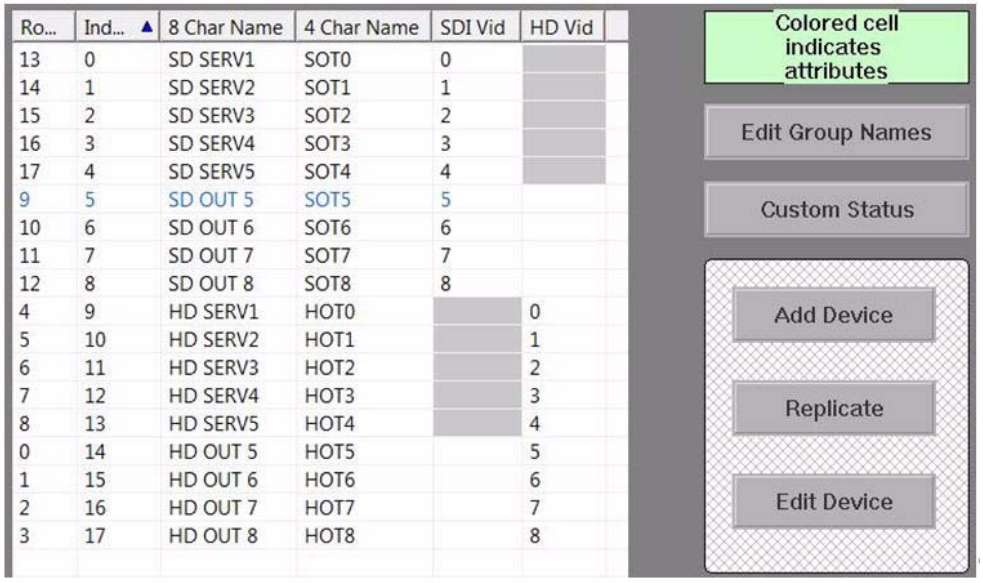


FIGURE 10. Destination Table with Tielines Assigned

10. While at the ‘System’ screen make sure to save the work. Go to the ‘File’ menu item at the top of the screen and then click ‘Save’.

11. Open any panels on the ‘System’ screen and drag these desired sources and destinations onto the panel. Close the panel editors and repeat step 10 to save the work.

12. Program all of these changes to the SC4/400 controller and panels by clicking on the yellow ‘P’ icon at the top of the screen. To verify that the changes were sent to the devices, go to the ‘Program’ tab at the bottom of the screen and see that each device was 100% completed.