

This tutorial must be distributed free of charge. No vendor, supplier or institution (commercial or educational) may charge any fee for supplying this tutorial. Please make copies freely!

This tutorial was NOT produced with any input from Electronic Theatre Controls (ETC). Any misinformation or editorializing is strictly mine. I wrote the tutorial using an Express 48/96 console using software version 3.1, but it should work on any Express console (24/48 through 250).

Welcome to the tutorial for the ETC Express lighting console. This is still a work in progress—see the electrics department if you have questions.

Please see Electrics before starting this tutorial. This tutorial assumes the following: that the board is hooked up to a monitor, has the appropriate DMX outputs attached, and that the current show has been backed up onto disk so that you cannot accidentally overwrite it. To begin, you should do the following:

Make sure that there is not a disk in the disk drive. The drive is vertical, on the right-hand side of the back of the board. If there is a disk in the drive, the board will always try to read it first for system updates—increasing the chances of accidentally corrupting the disk. Turn on the board by reaching behind the right-hand gooseneck light to the (rather small) rocker switch. You can adjust the level of the gooseneck lights with the dimmer knob centered between the lights.

For the length of this tutorial, the following text conventions will be used:

Underlined text denotes an on-screen prompt or warning. On the screen, these are usually red or yellow.

Bold denotes an actual key or slider on the light board

Italics denote the meaning of a key within the context of the screen or mode that you are using.

To save the show—make sure there's a disk in the drive.

Press **Setup**

Press **3 Enter** (*Disk Functions*)

Press **1 Enter** (*Write all to disk*)

Press **Enter** to confirm the save

Do this twice! With 2 different disks!

To clear the show and patch: ONLY do this if the show is backed up on at least 2 disks!

Press **Setup**

Press **4** (*Clear Functions*)

Press **5** (*Clear Show and Patch*)

Press **Enter Enter**

Pressing Enter the second time confirms the Clear.

To make sure the board is set up for the tutorial, do this: (I'll explain many of these settings later)

Press **Setup**

Press **1** (*System Settings*)

Press **1** (*Number of Dimmers*) **Enter**

Type **300 Enter**

Press **2** (*Number of Channels*) **Enter**

Type **48 Enter** (you could leave this number set higher if you want—it won't matter. If you're using a 24/48 console, 48 is the highest number you can enter here.)

Press **3** (*Default Fade Time*) **Enter**

Press **5 Enter 5 Enter**

Press **4** (*Default Level*) **Enter**

Type **30 Enter**

Press **5** (*Default Fader Clear Time*) **Enter**

Press **1 Enter**

Press **8** (*Blackout Key*) **Enter**

Press **1 Enter**

Press **9** (*Flexichannel*) **Enter**

Press **0 Enter**

Press **10** (*Grandmaster*) **Enter**

Press **1 Enter**

Press **13** (*Record Lockout*) **Enter**

Press **0 Enter**

If you're using an Express 250, omit these steps:

Press **14** (*Bump Buttons*) **Enter**

Press **1 Enter**

Press **15** (*Scene Mode*) **Enter**

Press **1 Enter**

Whew! Now we can get going....

Press **Stage**

Even if you have used the board before and the introductory parts of the tutorial seem too simple, follow the instructions exactly. It'll make the later parts of the tutorial make more sense. A lot of the tutorial is devoted to explaining the larger concepts behind what I'm asking you to do. If you'd rather not read the explanations, you can just follow the keyboard instructions which are always indented like this.

When you turn on the board, it will boot for a few seconds and then display the Stage screen. Some things to notice about the Stage screen:

The upper left corner should say Grandmaster 100%.

Find the **Master** fader on the console (near the center) and slide it down.

Note the change in percentage in the upper left corner.

Return the fader to 100%.

The Grandmaster proportionally affects the output levels of all channels on the board. Even if a channel is set to 100%, if the Grand is at 70%, the light will be on at 70%.

The upper center should say **Stage**, with the current time underneath it. **Stage** is the name of the screen that you're looking at. Everything (channel levels, effects, and cues that are running) that is happening on the lighting rig is displayed on the screen. Likewise, as soon as you make a change on this screen, it happens onstage. You can always get to this screen by pushing the **Stage** key on the console.

Press one of the other keys next to **Stage**, like **Blind** or **Patch**.

Note that the screen title (and appearance) changes, and that the LED lights up.

Press **Stage** again to get back to **Stage**.

The upper right corner should have a blue rectangle that says Chan. This means the board is waiting for you to talk to a channel number. (This fact is reiterated by the red instruction that says Select Channel Numbers in the middle center of the screen.)

Press the **Cue** key.

Notice that the blue rectangle now says Cue and that the red instruction has changed.

Press **Chan** (for *Channel*)

The blue rectangle will always have a prompt telling you what it's expecting. The value that you enter will appear here as well. If you enter the wrong number, you can start the instruction again—if you type "**Chan 7**" and you meant "**Chan 9**", press **Chan** again to reenter it.

Most of the middle of the screen will be filled with gray numbers arranged in a grid. These are the channel numbers used in each show. When you assign a channel a level, the level appears below the channel number. The number of channels displayed will depend on your console type and on whether you set the Number of Channels to 48 earlier in the tutorial.

The bottom of the screen has a row of gray rectangles. They should say things like "Sneak" and "Only." These rectangles are called **Softkeys**. The 8 rectangles correspond to the 8 keys on the keyboard **S1-S8**. Depending on which screen you are in, the meanings of these keys change. You will use these keys for many things—it's always important to check the current meaning of the Softkey before you press it.

Press **S7 More Softkeys**.

Note that the contents of the other Softkeys changes

Press **S7** again, and then a third time, to get back to the original list.

Any time I ask you to use a Softkey, you can look for it using *More Softkeys* if you don't see it.

Above the list of Softkeys are: on the left, information about the current cue (if any) and on the right, the cue list. We'll talk more about these later

The keyboard

I want to take a minute to name the sections of the keyboard to help you find the keys I'll be telling you to use. The number of keys may seem daunting at first, but the more you use the board, the more familiar it will become. So, starting from the top of the board and working towards you:

The top ledge of the board has outlets for Littlite® worklights and has the disk drive on the right-hand side.

Next come two rows of sliders, each with numbers and black buttons below them. Each slider controls the channel number written directly below it. In the second row of sliders, you'll notice that each one has two numbers below it—this board can also be used as a two-scene preset console, and in this case the smaller, subscripted number is the channel number. For this tutorial, however, we'll be using the larger numbers. The black buttons are called **bump buttons**. Holding down a bump button brings that channel to Full until you release the button. (If you have an Express 250, these sliders don't exist.)

In the bottom left corner is another row of sliders, numbered 1-24. They also have bump buttons, with LEDs that may or may not be lit. These are called **Submasters**. We'll talk about how to use them later.

In the center of the board, next to the **Submasters**, comes the **Master** fader with the **Blackout** button above it. You've already seen what the **Master** does, and the **Blackout** button shouldn't be a surprise: it takes out all channels until you press it again.

Press **Blackout**

Note that the LED comes on and the upper left corner of the screen blinks

Press **Blackout** again to turn this function off.

Next to the **Master** come two pairs of faders, each with a **Go** button and a **Hold** button below them. These are used to run cues—but we haven't recorded any cues yet. Unless I specify otherwise, we'll only be using the pair labeled **A/B**.

Next come the keypads, which you've already begun to explore. The strip of four keys beginning with **Stage** allows you to select the 4 most frequently-used displays. Below this is a strip starting with **About**. The important key in this group is **Help**.

Press **Help**

Follow the instruction

The next key you press will close the help screen

The row of **Softkeys** has already been discussed, and we'll spend more time with them later. Above them are the **Macro** keys, which allow you to record and playback sequences of keystrokes. We'll do that later, too.

Next to the **Macros** are four **Arrow** keys. You can use these to see different sections of your display—for example, the next screen of channel numbers, if you have more than 96 (or 100, on the 250).

The three keypads you'll use the most are closest to you: the numeric keypad, and the two sections on either side of it.

To the right of all the keypads is the trackpad. You can use this to change channel levels and to position moving lights.

So, with all of that said, let's get going!

We need to begin by Patching our show. Patching means we're assigning Dimmers (physical devices that control electrical current) to Channels (groups of dimmers in a light board.) A Channel could have just one Dimmer, or all of them. A Channel has no electrical rating or capacity—it's simply the way the board talks to the Dimmers. (NOTE: The DMX addresses of moving lights, scrollers, and such, are also treated as dimmers by the lightboard. Obviously, an address is not a dimmer, but a dimmer has an address too. Despite the fact that the Patch screen asks for the Dimmer **number** and Channel number, it may be helpful to think of it as the Dimmer's **address**. If I ever write the section on moving lights, we'll assign DMX addresses which are not dimmers.)

Press **Patch**

The screen displays Channel numbers on the left and Dimmer numbers on the right. Depending on whether you cleared the show from the board, there may or may not be any Dimmer numbers visible.

Type **Dim 1 Enter 10 Enter**

As soon as you press **Enter** the first time, this Dimmer turns yellow and the screen changes to show you where it is. If the Channel number says "—", the Dimmer is not assigned to a Channel. A Dimmer can only be assigned to one Channel—any time you assign a Dimmer, it moves to the new Channel.

Type **Dim 2 And 3 Enter 11 Enter**

Type **Dim 4 Thru 6 Enter 12 Enter**

You can move groups of Dimmers—you don't have to do them all singly if they have the same Channel.

If you put a Dimmer in the wrong channel, just retype the entry correctly. If a Dimmer isn't supposed to be in a Channel at all, try this:

Press **Dim 4 Enter 0 Enter**

Or this:

Press **Dim 5 Enter S6 (Unpatch)**

You can use the Patch screen to set proportional levels for certain Dimmers. Let's say you've cheated a bit, and you've put 2000w of PARCans on a Dimmer 6. Dimmer 6 is only rated for 1.8Kw. 1800

is 90% of 2000—so we need to make sure that this channel can never come up past 90%, or it will trip the breaker. The easiest way to do this is to assign a proportion to this dimmer.

Press **Dim 6 At 90**

90 appears in gray below the Dimmer number. The other Dimmers don't have proportions, and have no numbers below them. This means that they're patched at 100%—they'll always come up to 100% of their assigned level.

If you've been paying attention, you've realized that the 90% proportion takes effect not only if you try to bring the Channel up to Full, but at any level. If you bring it up to 50%, you'll only be getting 45% power coming out of the Dimmer. Sadly, that's the price you pay for cheating! Obviously, you'll set your levels based on the way the lights look onstage—not based on the numbers—so design your show and rest assured that Dimmer 6 won't trip due to overloading. (The other way around this is to write a Profile for this dimmer. A Profile tells the Dimmer exactly how to behave at every level, and is really beyond the scope of this tutorial.)

You can bring Dimmers up onstage, too, although you can't record them into cues or submasters. You might bring up an individual dimmer to check one light in a channel that has 5 lights—or if the channel isn't bringing up the right Dimmer.

Press **Stage**

Press **Dim 1 Full Full**

The board assumes that you'd like to do a Dimmer check. You can press + and – to step through Dimmer numbers.

Press **Rel** or **Clear** to exit the Dimmer check.

To bring a Dimmer up to a level other than Full

Press **Dim 1 At 30 Enter**

Now the board assumes you'd like to do a Dimmer check at 30%.

Press **Rel** or **Clear** again to exit.

We're not going to Patch an entire pretend show—you can do so if you want lights to come up in all the Channels we'll be using, but otherwise, let's move on.

Talking to Channels: We're going to spend a good deal of time exploring various ways to address channels, some of which you may decide really aren't very convenient. That's okay, and it's okay if you forget some of them and have to refer back to this section. Each designer programs a little differently (and each electrician types a little differently) and I want to make you aware of all the options. You'll figure out what works best for you when you start programming on your own.

Using the keypads (not the faders):

Make sure the the LED on the **Chan** key is lit. Press the key if it isn't.

This does two things: It tells the board that you're about to address a channel, and clears any numeric entry from the blue rectangle in the top right of the screen. If you type the wrong number during the following steps, you can press **Chan** to remove it.

Type **1 Full**

Notice that the screen shows the channel number in yellow and the level (Full) in red.

As soon as you enter a channel number, it becomes yellow to help you find it on the screen.

Type **2 And 4 Full**

Notice that both 2 and 4 are yellow, and that the **And** LED is lit.

This alerts you to the fact that more than one channel is active. An active channel is/are the channel(s) that the board is currently addressing.

Type **At 3 Enter**

Notice that, without having typed "2 and 4," the levels for those channels have changed.

Also notice that the levels for these channels are now 30%. (The board always displays levels in percentages, even though it doesn't show a % sign.) But you only typed "3," not "30." Because we don't usually give channels levels less than 10%, the board infers that you mean 30% and adds the zero for you as soon as you press **Enter**. But what if you wanted a level of 3%?

Type **At 03**

Notice that, now that you've given it an explicit 2-digit level, it gave you the 3%, and you don't have to hit **Enter** because it isn't expecting any other information.

Type **At 45**

As long as you keep beginning instructions with **At**, it will keep addressing channels 2 and 4. To talk to a new channel, simply type the channel number:

Type **15 Thru 30 At 6 Enter**

You can use **And** and **Thru** in combination:

Type **40 Thru 45 And 35 Thru 38 At 7 Enter**

Type **Full**

Notice that you didn't need to type **At** or **Enter** with **Full**. Time for a quick Sidenote: Most lighting consoles will infer a 2-digit number when you press **Enter**. But many of them will not automatically infer "Enter" if you actually type the 2-digit number—you'll still have to press it.

Now let's turn off some of those channels:

Type **15 Thru 20 Except 18 At 00**

You can use **Except** in combination with **Thru** and **And**, as well:

Type **15 And 17 And 19 Thru 30 Except 25 Thru 27 At 50**

So now we've got a bunch of channels up, but I want to see just channel 45 for a minute to check the focus. You could take everything out, and then repeat the steps above to bring it all back. Or:

Type **48 S7 (More Softkeys) S3 (Solo)**

Type **S3** again (following the instructions in red) to restore all of your levels.

You've probably noticed by now that Captured Channels is written under the blue rectangle. This means that these channels have been given levels, and that these levels are not from a submaster, channel fader, cue, or effect. They haven't been recorded anywhere, and will only be active as long as they're on the screen. Even when you take a channel out, there's a red 00 on the screen. To make the red numbers go away and "Uncapture" these channels, we need to Release them.

Type **Rel**

Notice a few things: Channel 50 no longer has a red level, the channel number is no longer yellow, the blue rectangle has cleared, the LED on release is lit, and the instruction says To release all captured channels, press RELEASE.

Type **Rel** again

All of the red numbers should be gone. Correspondingly, all of the stage lights should be off. Release is a powerful tool, and we'll keep coming back to uses for it.

So now there are no channels on and we're back where we started. We'll look at a couple of other ways to address channels, and then we'll move on.

Type **1 Thru 10 Level**

The **Level** key can be programmed to be any preset level. (We usually keep ours at 20-30% for channel check.) Notice that you didn't have to press **At** or **Enter**—it's just like the **Full** key.

Type **21 Full**

Type **+ Full**

Both 21 and 22 should now be at Full, with 22 still active. To keep them both active, try:

Type **21 And + At 3 Enter**

The **-** key can be used the same way.

Now, type **Enter**

Notice that the levels for 21 and 22 now have red boxes around them.

You could type **At 50** and the level would change and the box would go away. You could type **Clear** and the numeric value in the blue rectangle would be cleared, setting the level to 00. You could type **Chan** to remove the box and make 21 and 22 no longer active, leaving the level alone. But instead:

Touch the **Trackpad**, starting in the center and moving your finger up.

Do it a couple of times—until the channel levels change.

It would be pretty frustrating to try to change the channel levels this way—even by 5%. But:

Tap the upper small rectangle to the left of the trackpad.

Now touch the **Trackpad** again, moving up again.

The upper small rectangle sets the trackpad to “fast”

The lower rectangle sets it to “slow,” which you might use for moving lights where you need precise control.

Using the **Trackpad**, take the channel levels to 50.

Press **Chan** to deactivate these channels

And now for something different, we’ll try the channel faders along the top of the board.

Slide **25** through **30** to 75%

Slide **46** through **48** to 20%

Note that the levels appear in gold on your screen, and that the channel numbers remain gray. You cannot talk to these channels from the keypad without first entering their channel numbers.

Press and hold the **bump button** channel 40.

Now let go.

Note that the channel comes on to Full and goes off as soon as you release the button.

The look that we’ve created on the stage may not be very attractive, but let’s record it anyway. It will be our first cue.

Type **Record Cue 1 Enter**

The bottom left corner of the screen (above the Softkeys) should now say 1 XF 5 under the headings Cue/Type and Time. This means Cue 1, which is a Crossfade and has a time of 5 seconds. We’ll talk about the cue type later. The Time means the length of time it takes to complete the cue after you press the **Go** button.

Some other things to notice: When you pressed **Record**, the LED came on, as did the LED on the **Cue** button. The board assumed that you wanted to record a cue (not a submaster, or a group) and actually, you could have recorded it without pressing **Cue**. It’s always safer, however, to explicitly type **Cue** rather than trust the board’s defaults.

Press **Rel**

What happened? All of the captured levels are gone, but you just recorded the cue, so why did they disappear? You recorded it in the memory, true, but now you have to access what you just recorded. Not all light boards force you to do this, but this one does.

Make sure that the sliders for A/B (next to the **Master**) are all the way up.

Type **Cue 1** and then **Go** below the A/B faders

The **Go** button blinks for the 5 seconds that the cue runs, and all of the channel levels fade into place. Notice that the bottom right side of the screen now says Cue 1 in yellow, and Cue 1 also appears next to Fader A/B in the gray box.

All of the channel levels should now be green. Green means “this channel just changed levels in this cue.”

So, let’s change the look of this cue.

Type **1 Thru 5 At 60**

Type **21 And 22 Full**

Actually, 21 and 22 looked better where they were. Let’s not change them after all.

Type **Rel** just once.

21 and 22 go back to their recorded levels, but 1 through 5 (which we've also changed) stay captured and changed.

Type **Chan** to get rid of the To release all captured channels..... prompt.

Type **25 Thru 29 At 50**

Let's record these changes.

Type **Record Enter**

A couple things have happened here. When you pressed **Record**, the board warned you with a blinking yellow warning Cue Recorded. The blue rectangle displayed Cue 1. It's warning you that you've already recorded this cue, and are about to record over it unless you change the cue number (by typing a number—or better yet, **Cue** plus a number) or press **Clear** to cancel the record entirely. By pressing **Enter** you agreed to record over the cue

Press **Rel**

Channels 1-5 just changed color, but channels 25-29 jumped to 75%, even though you recorded them at 50%. The board is generally set up so that the *highest* channel level takes precedence over all others. This is called HTP for short—we'll see it again later. Since the submasters were at a higher level than the cue, they took control when you released the channels. Channels which are captured (in red) take precedence over everything except the **Blackout** key, whether there's a higher level assigned to them or not.

Slide **25-29** and **46-48** out.

Notice that after you passed the recorded level (50% or 20%) the numbers turned green or purple and stopped changing. Purple means "these numbers have not changed from their previously recorded levels."

Also notice that this time, the cue as you just recorded it is still on the screen. You don't have to load it and press **Go** again. You will have to do that every time you write a new cue, however.

5 Seconds is the default time for all cues, but you can record a cue with any time from 0 to 99 minutes and 99 seconds (99:99). Cues with times of less than 60 seconds can be timed to the tenth of a second.

You can also choose to split the time of the cue: give the channels whose levels are rising one time, and the channels whose levels are falling another time.

Type **Time 7 Enter Enter**

Notice that the blue rectangle prompted you for an UpTime and a DownTime. Pressing **Enter** the second time accepted the value already in the field—7, in this case.

Type **15 Thru 19 Full**

Type **1 Thru 5 At 00**

Type **Record Cue 2 Enter**

Type **Rel**

Type **Cue 2 Time 3 Enter 7 Enter**

Type **Go** (on the A/B fader).

Notice that the levels which are going down (1-5) take longer than the levels which are coming up (15-19). We didn't have to load Cue 2 before pressing **Go** because it came next after Cue 1. Now that we're in Cue 2, let's change the time again.

Type **Time 6 Enter 4 Enter**

Notice that the board assumed we were talking about Cue 2. If you want to be sure—and it's a good idea—you can always type **Cue ###** before changing a feature of that cue.

Type **10 At 50**

Type **21 And 22 At 00**

Type **Record Cue 3 Enter**

Type **Rel**

Type **Cue 3 Time 25 Enter 15 Enter**

We're about to run Cue 3, but we don't really want to wait 25 seconds for it to finish. So after you press **Go**, grab the A and B sliders, pull them all the way to 00, then push them all the way up to Full.

Type **Go** and run the cue in manually with the sliders.

Using the sliders this way overrides the recorded time of the cue, but doesn't change it permanently.

You may have noticed that it's a little less than convenient to make sure that you're in the right cue after you've recorded it. Let's spend a little time looking at the cue windows on the bottom of the screen.

How to know what cue you're in: The Cue number will always appear next to Fader A/B in the gray rectangle. While a cue is actually running, the Cue number is in red, and a countdown displays the time until the cue is finished and the percentage of the cue that has completed.

The cue that's running also appears in red in the Cue List on the bottom right side of the screen. When the cue is complete, the text turns yellow. The next cue to run appears in white below the current cue in this list. In this case, the next cue is also Cue 3, because there aren't any other cues yet. If you press **Go** again, Cue 3 will "run" but of course none of the channel levels will change because we're already in Cue 3.

This cue list window is obviously very small, and can really only show you what cue you're in now, what cue will run next, and what the last cue to complete was. If you want to see a list of all the cues, type:

Blind S2 (*Cue List*)

S4 and **S5** allow you to see more pages, if there are any.

Type **Stage** when done.

Now we'll make some other changes to cue times. In addition to splitting the up and down times of a cue, you can also ask either the up or the down to wait after you've pressed **Go** before they run. Also, you can tell an entire cue to run a certain amount of time after you've pressed **Go** on the preceding cue. This cue is called an "autofollow."

Type **Cue 1 Wait 3 Enter Enter**

Even though it prompts you for both an UpWait and a DownWait, you can only use one.

Type **Cue 2 S5 (Follow) 8 Enter**

Type **Clear A/B** (this is the **Clear** key next to the A/B faders, not on the number pad)

Type **Cue 1**

Press **Go**

Notice that the green numbers appear immediately, but they stay at 00 for 3 seconds before changing.

Press **Go**

8 Seconds after you've pressed **Go**, Cue 3 runs. Notice that the time begins counting from when you push the button—not from when the previous cue finishes. If you made a follow time of 0, the two cues would run at the same time. The board can run many cues simultaneously, although only the last cue will show a countdown in the fader window.

On second thought, I'd rather not make Cue 3 an autofollow after all. Let's remove it:

Type **Cue 2 S5 Clear**

This works for removing waits, as well.

We're going to look at some faster ways to change cues and channels next, but first we need to pay a little more attention to the **Go** button and faders. In the steps above, I asked you to press **Clear A/B** but didn't explain it. The **Clear** keys remove all cues from the faders. They do not affect captured channels, submasters, or channel faders. They simply put the board in a status of not being in a recorded cue. (Some other boards have a "Goto Cue 0" function that works the same way.)

Press **Clear A/B**

Type **Cue 1 Go**

Before the cue finishes, press **Hold A/B**

Notice that the cue stops running and that the **Go** and **Hold** buttons both blink.

Press **Go**

Now the cue will finish.

Let's try this again, but doing something different:

Press **Clear A/B**

Type **Cue 1 Go**

Before the cue finishes, press **Hold A/B**

Press **Hold A/B** again

Now the Fader window says Cue 1 is complete—even though it isn't! By pressing **Hold** twice, we've told the board to stop right where it is and not run Cue 1 anymore.

Press **Go**

Cue 2 will run, exactly as though we'd finished Cue 1

Press **Back A/B**

Cue 1 should now run, with its recorded time and recorded wait. (You can always run it in manually if you want.)

Back is a convenient tool—especially if, when you're running a show, you get ahead of the stage manager somehow and have to back up! But it has an annoying quirk: Let's say you have a show with 100 cues. You load cue 85 to make a change, and record it. Then you load Cue 5 to make a change, but you realize you actually need to see Cue 4, first. You press **Back**, expecting to get to Cue 4 (the cue before 5!), but instead the board will send you back into cue 85 (the cue you were in before Cue 5.) During a show, you wouldn't run cues out of sequence, so if probably wouldn't be a problem, but beware of while doing cue notes.

Before we move on, we should do one other quick thing: Add a cue between existing cue numbers.

Type **Cue 2 Go**

Type **35 And 37 And 40 At 60**

Type **Record Cue 2.5 Enter Rel**

Type **Cue 2.5 Go**

Simple! Now let's go back to Cue 1:

Type **Cue 1 Go**

Now it's time to look at an important feature on any light board: Tracking. Tracking is a very powerful tool—and an easy way to make large mistakes if you don't understand what it's doing! This board makes it *harder*, though not impossible, to make some of the mistakes, though, so bear with me and you'll learn to use it as the tool that it really is...

What is Tracking? When you record a cue, the board writes down every level for every channel. But often, only some of the channels change between cues. The rest stay the same. In our 4 cues, channels 6-9 are the same for the whole "show." These channels are said to "track" which really means "they stay the same for those cues." A track can be as short as 2 cues, or as long as the entire show. The track ends when the level changes. We can use this to our advantage. Let's say that we want to raise the level of these channels in all 4 cues—it just isn't bright enough. Try this first:

Type **6 Thru 10 At 40**

Type **Record Cue 1 Enter**

Type **Rel**

Press **Go**

They go back to 30% in cue 2. So now we have to change them again. Let's look at two ways of using tracking to make this easier. First, let's try "manual tracking." Manual tracking (yes, I did just make up that term) does the same thing we just did, but it saves you some keystrokes.

Type **Cue 1 Go**

Type **13 And 14 And 20 At 75**

Type **Record Cue 1 Enter**

DO NOT PRESS RELEASE! (if you did, just capture these channel numbers again.)

Press **Go** (you should be in Cue 2 now)

Type **Record Cue 2 Enter**

Press **Go** (you should be in Cue 2.5)

Type **Record Cue 2.5 Enter**

Press **Go** (you should be in Cue 3)

Type **Record Cue 3 Enter**

Now you can press **Rel**

The advantage to doing your tracking this way is that you can look at every cue before you modify it. You could always skip over a cue that didn't need to be modified. Of course, if you knew for certain you wanted to update 100 cues, even this method would get old. Let's go back to Channels 6-10 again. By using the Tracking function of the board, we'll tell it "every time it was at level A (the level of the cue I'm recording this in), make it level B (40%). Stop when you reach a level different from level A."

Type **Cue 2 Go**

Type **6 Thru 10 At 40**

Type **Record Cue 2 Track Enter**

Type **Rel**

Press **Go**

The channels stay at 40% in cue 2.5.

Press **Go** (you might want to run this one manually)

They stay at 40% in cue 3, too, except for channel 10, which we changed awhile ago. Because it had a change recorded here, our tracking won't overwrite the change.

You have to be careful using tracking—it would be easy to overwrite whole scenes when you only wanted to change one cue! Some other consoles allow you to set the console to "tracking mode"—meaning any change you make will automatically track as long as it can. This means you can change lots of things very quickly unless you temporarily turn off tracking by saying "record this in *this cue only*." These consoles can also operate in "cue-only mode" where you can temporarily turn *on* tracking the way we just did.

Let's look at a couple of screens that will make understanding Tracking a little easier.

Press **Blind**

The screen looks nearly the same—it's still displaying Cue 3, with all the same channel levels. The difference is that in Blind you can look at the contents of cues without actually changing the lights onstage. You can also modify cues (even record new cues) without seeing them onstage.

Press **Cue -**

The **Cue** key is the default key in Blind, but it's still a good idea to press it. The **+** and **-** keys let you skip through cues in order.

Press **Cue 1**

You don't even have to press **Enter**—it shows you Cue 1.

Press **Cue +**

+

+

+

Pausing each time to watch the tracking of channels 6-10.

You can use Blind to check other cues before deciding whether to record the current cue tracking or without.

You can also edit cues in Blind, using all the same methods you do on Stage. You must record the changes (either in the old cue or with a new cue number) or they'll be lost when you move to a different cue. (Many other light boards *automatically* record changes made in Blind.) You can record cues using Tracking or not using it.

Press **S3** (*Spreadsheet*)

This is exactly what it says it is—a spread sheet of all the cues. The Cue numbers are on the left side, with the channel numbers along the top. You can see more channel numbers by pressing the **Left** and **Right Arrows**. You could see more cues (if we had them) by pressing **S4** and **S5**.

Press **Track** or **S7** to turn on Tracking.

Notice that the upper right corner says Tracking Enabled. If it doesn't: Press **Track** or **S7** again.

Let's try a couple of things in here:

Press **Cue 1 Chan 6 Full**

Press **Cue 2 Chan 1 At 60**

Press **Chan 2 At 50**

The board interprets 00 and no entry as the same level, so these levels tracked in *both* cases. What if we wanted to make a change in just one cue from this screen? With tracking turned on, there is a way, but not a very good one:

Press **Cue 2 Chan 7 At 00**

Press **Cue 2.5 Chan 7 At 40**

That's not very elegant, but it works. You can also use the **Arrow** keys to change Cue numbers.

Now try:

Press **Track** or press **S7**. Either of these turns Tracking off.

Press **Cue 1 Chan 8 At 30**

Press **Cue 1 Thru 2.5 Chan 9 At 25**

You can change a single cue, or a selection of cues, with Tracking turned off.

Press **Cue 1 And 3 Chan 15 And 16 At 00**

Warning! Beware of the **Clear** key in this screen. Try this:

Press **Cue 1 Thru 3 Chan 18 At**

Oops, I meant Cues 1-2.5, not 3.

Press **Clear** to reselect the cue numbers

Oh no! The **Clear** key changed the *level* of the channel—it didn't just back us out of a wrong entry. And, even worse, there's no way to undo what we just did.

Now, granted, You probably remember what channel 18 was at. Or you could go back and read the previous pages and find out. But what if you'd accidentally blanked out 100 cues with lots of changing levels? Because the Spreadsheet screen **automatically** saves all changes, you can do some damage pretty fast. But as long as you're careful, you can edit lots of cues very quickly. And, better than in Blind or Stage, if you're using Tracking you can see immediately if a channel tracked or didn't track.

By the way, pressing **Cue** in the above example would have backed you up and not deleted anything.

It will probably be a while before you start using Spreadsheet a lot to change cues. But it's a great way to just *look* at a bunch of cues at once, even if you don't make changes.

Press **Stage**

Press **Clear A/B**

We're going to leave our 4 cues alone for a while as we explore some other ways to access channels more directly.

It is often true that a designer may use specific channels together most of the time, and all at the same level. In this case, it makes programming faster if you write those channels all into a group. Then you can call up all the channels at once.

Type **Chan 1 And 11 And 21 And 31 Full**

Type **Record Group 1 Enter**

Type **Rel**

Type **Group 1 At 30**

Now you can use the Group the way you would use individual channels. Let's make another group.

Type **Rel**

Type **2 And 4 Full**

Type **6 And 8 At 50**

Type **Record Group 2 Enter Rel**

Type **Group 2 At 75**

When recording a group, the levels that you give the channels specify the *proportion* of the level that you give the whole group. So Channels 6 and 8 are now at 50% of 75%, whereas 2 and 4 are at 100% of 75%.

You can address multiple groups at the same time:

Type **Group 1 And 2 Full**. You do not have to press **Group** twice.

You could press **And Chan ###** to add a single channel to the command, but when I did this (while writing the tutorial) it took channels 6 and 8 to Full as well. Somehow adding a single channel in with the rest disrupts the "Group" mode—they all behave like single channels.

What if you're in the middle of programming and decide you want to write a group? Recording a group records everything on the screen—and you can't black out the stage during rehearsal! You can write the group in blind, just as you can write cues:

Type **Blind**

Type **Group 3 Enter**

Type **Chan 30 Thru 39 Full**

Type **Record Group 3 Enter**

Type **Stage**

Type **Group 3 Full**

Press **Rel**

You do not have to use sequential numbers for your groups. In Blind, using **Group +** and **-** will skip through only the groups which you have recorded—no matter what the numbers are.

You can delete Groups in Blind as well. (You can also delete cues there.) Press:

Blind

Group 2 Enter

S6 (Delete Group) Enter Enter

This is exactly the way you delete Cues, in fact; just replace **Group** with **Cue**

Another way to group channels together is to record them onto a submaster. Used this way, a submaster is like a group that you can manually control with a slider. You can record a Submaster in either Stage or Blind the way we've already talked about for Groups. (You can delete them the same way.)

Type **1 Full**

Type **Record Sub 1** or **Record Sub** and push the **Bump Button** for **Sub 1**

Press **Rel**

Slide the **Sub 1** fader up, then back down

Press the **Bump Button** for **Sub 1**

Notice that channel 1 comes on and stays at Full until you let go of the button.

Type **Sub 1 Time 3 Enter Enter 3 Enter**

Now press and hold the **Bump Button** for a few seconds. Note that the channel now fades up in 3 seconds, and fades down in 3 seconds as soon as you let go of the button.

Type **Sub 1 Time 4 Enter Clear Enter 2 Enter**

Press and release the **Bump Button**

Now the channel fades up in 4 seconds and stays on, because we've set the Dwell to "Hold." A dwell time is how long a channel stays up before starting to fade back down. "Hold" means "until I press the button again."

Press and release the **Bump Button**.

The channel should fade out in 2 seconds.

Given this feature of Submasters, you could almost record all of your cues into submasters and then just press the right bump buttons. It would be awkward, but it could work, with a little planning. We're not going to explore doing it now, but we'll explore something that's close:

Sometimes you have to run a show you've never seen before, with no recorded cues, but the artists say something like "We'd like a lot of blues and greens, and you can change the cyc around, and we'll need a special for the drummer when he does a solo. Oh, and one for the bass player, too. But he doesn't always do the solo during the same part of the show. And after the second-to-last song, we need to drop to a silhouette with only the cyc on, then restore everything else slowly.

So, I'm going to make up some imaginary channel numbers, and then we'll look at a few ways to accomplish our imaginary show. A real show would probably have more channels, but hey, it's a tutorial.

Channels 1-10 = front light

Channels 11-20 = green sidelight

Channels 21-30 = blue toplight

Channels 31-35 = backlight with scrollers

Channels 36-40 = scroller control channels.

Channel 41 = blue cyc

Channel 42 = green cyc

Channel 43 = red cyc

Channel 45 = drum special

Channel 46 = bass special

Type **1 Thru 10 Full**

Record Sub 2 Enter

Rel

11 Thru 20 Full

Record Sub 3 Enter

Rel

21 Thru 30 Full

Record Sub 4 Enter

Rel

31 Thru 35 Full

Record Sub 5 Enter

Rel

41 Full
Record Sub 6 Enter
Rel
42 Full
Record Sub 7 Enter
Rel
43 Full
Record Sub 8 Enter
Rel
45 Full
Record Sub 9 Enter
Rel
46 Full
Record Sub 10 Enter
Rel
36 Thru 40 Full
Record Sub 11 Enter
Rel

You can now run the show by bringing up Subs 1-7 at pleasing levels, and setting the scrollers to the desired colors. The bass player can do his solo whenever he wants. But what about the silhouette? You could fade all the submasters down—you have 10 fingers! But then you have to bring them back up, in a different order, but sort of precisely. And you have to make sure not to take out the scroller channels, because then they'll scroll down to their 00 setting, and back up again when you bring them back up. That's a lot to do all in a few seconds. Let's try to make it easier.

Press **Setup**
Type **11** (*Channel Attributes*) **Enter**
Type **36 Thru 40 S1** (*Independent*) **1 Stage**

Setting these channels to Independent means that they respond only to cues, subs and keystrokes—even the Grandmaster cannot override them.

Slide **Sub 11** up
Slide the **Master** down
Notice that they don't respond
Bring the **Master** back up and **Sub 11** down

You may also need to hit **Rel** an extra time to release these channels when they're captured.

Now, when we fade out all the lights, the scrollers won't keep changing colors to get to their zero level. They'll stay put. This means we could use the **Master** to take out all the rest of the lights—except we're supposed to leave the cyc on, and just take out the other lights! So let's write ourselves a new master.

Type **1 Thru 35 And 45 And 46 Full**
Record Sub 24 Enter
Rel
Type **Sub 24 Type 2**
Slide **Sub 24** all the way up and back down.

We slid the sub up and back down because, after changing the type of sub, the board wanted you to know that it was different. Moving the sub resets it. Until we reset it, the LED blinked and the upper left corner flashed Sub Page 1.

Slide **Sub 1** to 60%-ish
There's nothing on the screen

Slide **Sub 24** to Full

Now our channels are no longer inhibited by the submaster—they can come up.

Slide some other subs up, including the cyc (Subs 5-7) and the scrollers (Sub 10)

Slide **Sub 24** down.

Notice that neither the Cyc nor the Scrollers are affected by the new mini-master—the Cyc because we didn't record them as inhibited, and the scrollers because they're independent. We also didn't record the scrollers into the mini-master—true—but they also can't be controlled by the Master.

Submasters, all in all, can do a lot more for you than just a simple group. Too bad you only have 24. Actually, you have a lot more than 24, you just only have 24 physical sliders. The board contains 10 pages of memory for these sliders—so each slider can have 10 possible values.

Type **Sub Page 2 Enter**

The warning blinks in the upper corner again, to tell you that you have subs up, from Page 1, that are now supposed to be controlling something else on Page 2. The Page 2 settings won't take effect until you slide them all to zero.

Slide all the **Subs** to zero.

Now the warning should be gone.

You can record subs on any page by making sure to type **Page ###** in the Record sequence:

Type **2 Full**

Type **Record Page 3 Sub 1 Enter Rel**

The LED is not lit up. That's because we're still on Page 2.

Type **Page 3 Enter**

Now the LED for Sub 1 should be lit.

Obviously, you'll need to do some planning to use more than one page of subs at a time. You can't have channels in separate pages that you know you'll need to be able to control at the same time, and you'll always have to record changes to cues before changing sub pages—or risk losing your levels.

Before we leave the topic of submasters, we need to look at one more thing.

Press **S7** (*More Softkeys*) **S2** (*Sub List*)

This is a list of all of your submasters. It should be displaying Page 3 right now.

Type **Page 1 Enter**

The subs which are recorded have green numbers.

Use **S5** to scroll down

Sub 24 has a red number (because it's an inhibitor) and blinks (to warn you about switching pages).

This page also shows you the recorded Up/Dwell/Down times for each sub, as well as they type (Pile-on, except for 24). The column labeled "Bump" should be empty, and refers to the **Bump Buttons**.

Type **Sub 1 S1** (*Bump Status*)

The three options appear in red: Enabled, disabled, solo. "Enabled" means that the Bump button works. "Disabled" means that the button doesn't do anything. "Solo" means that while the button is pressed, all other channels are forced to zero (except independent channels)—the same as the Solo softkey.

Press **Sub** to get out of this menu.

Press **Stage**

The last thing we need to study regarding controlling channels is the Park function.

Type **S6** (*Park*)

This shows you a split screen, with dimmers on top and channels on the bottom.

Type **Chan 48 Enter**

Type **At 50**

Type **Dim 22 Enter**

Dimmer 22 is now parked at 00, and Channel 48 at 50%. These channels will not respond to any commands from the keypad, subs, or cues. The levels will appear on the screen, but the output of Dimmer 22 will ALWAYS be 0%, and all of the dimmers in Channel 96 are stuck at 50%.

Type **Chan 96 Rel**

Stage

We don't need this channel parked, but it's a useful tool. If a light drops focus during a show, you can Park it at 00 until after the show when you can refocus. Or you can park the control channels for a moving light so that you can't accidentally shut down the fixture while programming. Or park the houselights on during rehearsal, but not record them into the cues.....

This concludes the "basic" section of the tutorial. With what you know now, you can program a show, make your cues run the way you want them to run, use submasters effectively, and edit your cues. There's still more to come—like writing effects and using moving lights, but now is as good as any time to talk about a very important thing: SAVING YOUR WORK.

Type **Setup**

Type **3 (Disk Functions) Enter**

The board stores everything you've recorded (cues, subs, groups, the patch, effects) in its own memory, but it's still a good idea to back up your show onto 2 disks. Not one, but 2. Why? Because, not infrequently, a disk will get corrupted. You won't know it, however, until you try to *read* from the disk. It won't warn you when trying to *write* to the disk.

It's a good idea to format the disks before saving to them (this erases everything else on the disk) but any IBM-formatted disk should work. Write all to disk is pretty simple. Read show and Read all differ only in that Read all reads all of the system settings as well as the cues and subs and effects. Read system configuration would only be used if you were upgrading or restoring the system.

You can only save one Express file on a disk. It will always be called EXP2.shw, and any time you save to this disk, this file gets re-written.

Type **S8 (Return)**—Return means "go back to the previous screen."

Since we're here, I want to look a little at the Setup options. You saw them at the beginning of the tutorial, and by now you've probably guessed what some of them do.

Type **1 (System Settings) Enter**

In this screen, you can set the default levels for Level and cue fade times. You can turn the blackout key on and off, turn off/on all of the bump buttons for the channel faders, and set the number of dimmers and channels. You can also set the board to two-scene mode here (option 15), although we're not going to address that in our tutorial.

Type **S8**

Type **4 (Clear Functions) Enter**

The Clear screen allows you to delete parts of the show and setup singly or all at once. Don't clear part of an active show without saving to 2 disks!

Type **S8**

We've already seen what "Disk Functions" and "Channel Attributes" look like, and later we'll come back to this screen.

Type **Stage**

There's another, more advanced aspect of writing cues that we should cover: the Part cue. A part cue allows you to assign channels different fade times within the same cue. Let's say you have a 6 count cue, but you need the cyc to come up in 12 counts. You could write an autofollow cue, which ran on a Follow of 0 (so the two cues ran at the same time). But then you're dealing with two separate cues, and if you make changes to one, you have to reflect them in the other. A Part cue keeps all of the channels in the same cue, and assigns each part a different time. Each cue can have 8 parts. Each part has a number—and for some reason, ETC's default number is "8." When you write a cue with only one part, and later add a second part to it, the part you wrote in the beginning is called Part 8.

Type **Blind Cue 2**

42 And 43 Full

Record Cue 2 S7 (More Softkeys) S1 (Part) 1 Enter

Notice that all of the other levels on the screen are now dark gray.

Type **S1 (Part—you might need S7 first) 8**

Now that you're viewing Part 8 (the part we originally recorded) only the levels for 42 and 43 are gray, because they're not in the part that we're viewing.

Type **S1 (Part) 1**

Time 12 Enter Enter

What if we wanted to move a channel from Part 8 to Part 1?

Type **46 Thru 48 Enter Enter**

Record Cue 2 S7 S1 1 Enter

This screen gets a little confusing to navigate, because you always have to make sure that you're looking at the right part before you modify it, and then that you record the right part number. But it's worth the time to make the cue come up perfectly.

Type **Stage**

Notice that your cue list now displays Cue 2 as having a type PT (part) and a time of 12. The time isn't strictly correct—the board just displays the total time it will take to complete all parts of the cue. You can see the time for each part when looking at it in Blind (it's in the bottom left corner) or on the Cue List screen (**Blind S2**).

While we're back to talking about Cues, we should also talk about Cue Types.

Type **Cue 2.5 Type**

You get 4 choices:

Crossfade: the default type. Channels fade up or down using the recorded up/down times. If multiple cues are running at once, channels fade to the level in the last cue to run. Most of the time, there's no reason to use another type of cue.

Allfade: An Allfade cue forces any channel which does not have a level to go to 00. This prevents channels from accidentally tracking from a previous cue into this cue. We'll explore that in a minute.

Effect: An Effect cue has an effect recorded into it. We'll write effects later.

Blocking: A Blocking cue works sort of like an Allfade, except it allows Latest-Takes-Precedence channels to finish their instructions and forces all *other* channels which do not have levels to go to 00. LTP channels may be part of moving lights, or you can set any channel to LTP in the Channel Attributes screen. For an LTP channel, a level of "no level" is not the same thing as a 00, so a Blocking cue helps sort this out and guarantee that these channels do not get forced to 00. For more information about LTP and Blocking cues, you should read the manual.

Type **Cue 3 Go** (you'll want to run this in)

Type 1 Thru 30 And 46 Thru 48 At 00

Record Cue 5 Enter

Rel

Obviously, we've written a blackout.

Type **Blind**

Notice that only the channels which appear in Cue 3 have levels of 00 in Cue 5.

Stage

Cue 1 Go

Chan 12 At 50

Record Cue 1 Track

Rel

Blind Cue 5

Since there wasn't a 00 under Channel 12, it didn't realize it should stop tracking.

Type **Chan 12 At 00**

Record Cue 5 Type 2 (Allfade) Enter

Now it has filled in the zeros for you on all the channels. Nothing can track through this cue and spoil the blackout now. Of course, you can use this for more than blackouts—use it anywhere you want to make sure that changes don't track through.

Type **Stage**

Type **Clear A/B**

Cue 1 Go

It could get sort of tiresome to always have to wait for the cue to complete or run it in manually. Fortunately, there's a function to save you from this sort of boredom.

Type **S7 S1 (Enable Quickstep)**

Quickstep flashes in blue in your fader windows.

Press **Go**

The board ran Cue 2 in zero time, but didn't change the recorded time of any of the parts

Press **Back**

It also goes back in the zero time. A nice feature when you just want to jump through cues looking for changes, though perhaps a bit hard on your dimmers. You can change and record cues without having to enable Quickstep again. If you change displays (to Blind or Patch) Quickstep turns off. Or press **S1** again to turn it off.

I've promised a couple of times that we'll write effects. So let's give it a shot. You can write effects into either a submaster or a cue. I don't like writing them into cues, so we'll skip over that and write them in submasters instead. (If you want to write effect cues, the method is largely the same—you just run the effect on a follow of zero from the previous cue, and then have to back up all the time to edit the cue with the lights which are *not* in the effect.)

Press **Blind Sub 12 Type 3 (Effect)**

The screen immediately changes to the effect screen. In the main part of the window there are columns: Step for Step number. Each step in the effect gets a separate number. Each effect can have 192 steps. Chan for the channels which are in this step, and their levels. Time for the time between the beginning of this step and the beginning of the next step. In for the time it takes to fade these channels up. Dwell for how long these channels stay up until they begin to fade down. Out for the time it takes to take these channels out. Lo for the lowest level channels NOT in this step will reach. Hi for the highest level channels IN this step can reach.

Press **S1 (Step) 1 Enter**.

Press **1 S8 (Add Channels)**.

You have to type Add Channels, not Enter, to put the channels in the step.

Press **At 60**.

When channels are added, they default to Full and do not display a level.

Press **S1 2 Enter**.

Press **2 S8**
Press **Record Sub 12 Enter**
Press **Stage**

Press the **Bump Button** for **Sub 12**. You may need to hold it while the effect runs, but we'll fix that in a minute. Channel 1 should be flashing on to 60%, then going out while 3 comes on to full. Not a very exciting, effect, I guess, but we'll make it better.

Press **Blind Sub 12**
Press **Press S7 S7 S1 (Bump Status)**
Press **1 Enter**

This turns the bump button on so that you can press it once to turn it on, and press it again to turn it off. Had you chosen Solo it would make this sub work the way Solo usually works—everything else will be forced out while you hold the button.

Press the **Down Arrow** twice to make a Step 3
Press the **Right Arrow** to enter the Channel column
Press **3 S8**

Press **S1 1 Chan 1 Full**
Press the **Right Arrow** to get to the Lo column
Type **30**

Use the **Arrows** to change the other Lo values to 30
Note: to remove a channel from a step, press **Chan ## Clear** while in the channel window.
Press **Record Sub 12 Enter**
Press **Stage**
Press the **Bump Button**

Now we've written a 3-step chase, where one channel comes up to Full and the others only go down to 30%. If these channels were marquee lights, they'd look fabulous! But maybe you think they're running too fast...

Press the **Bump Button** to turn off the effect
Press **Blind Sub 12**
Press **S1 1** and use the **Arrow keys** to get over to the Time column
Change this column in all the steps to **3**. This Time is measured in seconds.
Press **Record Sub 12 Enter**
Press **Stage**
Press the **Bump Button**

Well, that's certainly slower. But let's move away from chase sort of effect—let's turn this into something where the three channels are at a base level (30%) and, in turn, *fade* up to full.

Press the **Bump Button** to stop the effect
Press **Blind Sub 12**
Press **S1 1** and use the **Arrow keys** to get over to the In column
Change all three Steps to **1**
Change all of the Dwell values to **0.5**
Change all of the Out values to **0.3**
Press **Record Sub 12 Enter**
Press **Stage**
Press the **Bump Button**

Actually, it would be nice if the channels went all the way out but only came up to 70%. Also, Channel 3 seems a bit too bright. Let's fix those things. We'll use the level limits to change the out level, and the individual level of Channel 3 to fix its brightness.

Press the **Bump Button** to stop the effect
Press **Blind Sub 12**
Press **S1 1** and use the **Arrow keys** to get over to the Lo column

Change all the values to 00
Change all the Hi values to 70
Press **S1 3 Chan 3 At 90**
Press **Record Sub 12 Enter**
Press **Stage**
Press the **Bump Button**

The level of Channel 3 proportionally affects the Hi level.

We could have chosen to change the levels of Channels 1 and 2 to 70%, and left the Hi level alone—but what if there were many channels in each step, not just one? If you want all of the channels to do the same thing, it's easier to use the Hi/Lo levels to set your limits.

Press the **Bump Button** to turn off the effect

Press **Blind Sub 12**

Press **S7 S8** (*Attribute*).

Notice that *Delete Step* and *Insert Step* appear on this page of Softkeys as well.

The Attributes of an Effect describe how the Effect runs.

All Effects are either Positive or Negative. Positive means that channels in each step fade from their Lo value to their Hi value, and then back to Lo. Negative means that they fade from their Hi to their Lo, and then back to Hi.

In addition to being Positive or Negative, an effect can be:

Alternate: The effect runs first Positive, then Negative (if it's Positive to begin with), and continues to Alternate back and forth. If an effect is Negative Alternate, it begins with the Negative cycle.

Reverse: The effect runs its steps in reverse order—3-2-1, not 1-2-3.

Bounce: The effect runs its steps 1-2-3, then 3-2-1, then 1-2-3. If it is a Reverse Bounce it begins by running first in reverse.

Build: The effect uses only the In times to fade each step up to the Hi level. After it has finished every step, it takes all the channels out and starts over again.

Random: The effect runs its steps in random order.

Random Rate: The Time between steps is randomly selected with the parameters you set. Parameters can be anywhere between 0 and 2000. 100 is the default. These parameters represent a proportion of the normal rate.

You can combine most of these, but you can't combine Random with Build, Reverse or Bounce. The permutations are (nearly) endless. You do not have to record the Sub to save Attribute changes. To remove an Attribute, press the Softkey again.

Press **S3 S5** (*Reverse, Build*)

Press **Stage**

Press the **Bump Button**

I'll let you continue to explore the permutations on your own...

Press the **Bump Button** again to stop the effect.

I like using a Submaster to write an effect because you can easily turn it off when you need to record a cue. If you don't turn off the effect, you'll record the current levels into the cue. A little later, we'll learn a way to turn on a submaster with a cue, so the operator only has to push one button.

COMING SOON—a section on writing Effect cues. I don't like them, though, so I haven't written it yet.

Now that we've seen both kinds of effects, I promised I'd show you a way to fire a Submaster effect within a cue. We'll use a Macro to do this. A Macro is a recorded set of keystrokes. It could be just one keystroke, or an elaborate sequence that runs cues for you. We'll stick to simple ones—once you understand how a Macro works, you can write nearly anything you want.

Press **Setup**
Press **8** (*Macro Editing*) **Enter**
Press **S1** (*Select Macro*) **12 Enter**

We'll call this Macro 12 because it's going to fire Sub 12, but you could call it anything you want.

Press the **Bump Button** for Sub 12
Press **EnterMacro** (it's over near **Help**)

That's it! If you accidentally press the wrong thing, use the **Arrows** to highlight the wrong entry and then use **S3** (*Delete Entry*) to remove it. The Macro screen records EVERY keystroke, so **Clear** doesn't work.

Press **Stage**
Press **Cue 2 Link EnterMacro 12 Enter 0 Enter**
Press **Cue 3 Link EnterMacro 12 Enter 0 Enter**
Press **Cue 2 Go**
Press **Go** 2 more times to run cues 2.5 and 3.

Now we're asking Cue 2 to press the Sub 12 button, which starts the Effect. It runs through Cue 2.5, and stops when Cue 3 presses the button again. (You can press the button earlier to turn it off yourself, but then Cue 3 will turn it *on*, not off.)

Notice that the board prompted you for a Follow time for this Macro. It assumes you would like the Macro to start after the entire cue has finished running—if this isn't true, change the number (which we did.) You can't have both a Macro and an Autofollow running off of the same cue. You'll have to delete the Macro (**Cue ## Link Clear**) to run an Autofollow instead.

You also can't link more than one Macro to a cue—you'd have to write a Macro that fired the other Macros. You can do this by pressing **M*###**—but then the Macro editor gets a bit confused—you have to reselect the Macro to add **Enter**, and the other Macro numbers. If I figure out a better way, I'll let you know!

That Macro was so simple, we ought to write another one.

Press **Setup**
Press **8 Enter**
Press **S1 1 Enter**
Press **At 00 + Full**
Press **EnterMacro**
Press **Stage**
Press **Clear A/B**

Can you figure out what this Macro does before we use it?

Press **1 Full**
Press **M1**

The LED for **M1** should now be lit, since we just recorded it.

Now we've got a "Next Channel" button, handy for channel checks. It should be easy for you to write a "Last Channel" button, as well.

I chose **M1** for two specific reasons: First, it's one of the 3 pre-set buttons you have on the keyboard. The rest of the time, you have to press **M*### Enter** to trigger a Macro. Second, it's the only pre-set button the Remote Focus Unit for this board. So if you have a remote, you can now use this Macro while standing on deck doing a focus check.

That's it!

Save your work on a disk and give it to Dave. (Go to page 1 or 17 if you don't remember how.)