PLC 3200

Programmable Lighting Controller

OPERATOR'S MANUAL

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1 - INTRODUCTION

The PLC 3200 is a programmable thirty two channel lighting console with memory for 101 scenes. The memory is nonvolatile which means that the memory is not lost when the power is turned off. With the PLC 3200 you can create scenes with various dimmer levels as well as scenes which are combinations of special effects such as chase or audio sync. Scenes can be recalled from memory either with a numeric keypad and Go switch or with the use of 36 sub master faders. In addition a complete MIDI implementation is provided which allows you to connect the PLC 3200 to a MIDI controller or sequencer to create automated lighting effects.

Like all SUNNSPOTS components, the PLC 3200 uses the SUNNPLEX multiplexing system that allows the various parts of the lighting system to be interconnected by way of standard three conductor microphone cables. This eliminates the fragile and expensive multi-wire snakes required by other lighting systems. The application of this technology to stage lighting equipment makes system setup and operation easy and convenient. Also, in most cases, SUNNPLEX allows coded lighting control signals to be sent through audio snakes without interference to other signals.

In addition to the SUNNPLEX signal the PLC 3200 also supports the USITT standard multiplexing signals DMX512 and AMX192. These will allow you to connect the PLC 3200 directly to many different manufacturer's lighting systems. Also available from SUNN is the DEPLEX 216 which converts the SUNNPLEX signal to discreet 0-10 Volt signals which will drive most older style lighting systems which don't use a multiplexing scheme.

2 - SYSTEM CONNECTION

POWER

Figure 1 shows the rear panel of the PLC 3200. To the far left is the power switch, the fuse and the AC input connector. A detachable AC cord is provided with the unit. There is a switch inside the PLC 3200 to select between 115 volts and 230 volts. Refer this adjustment to a qualified service technician since the unit must be opened in order to switch the voltage.

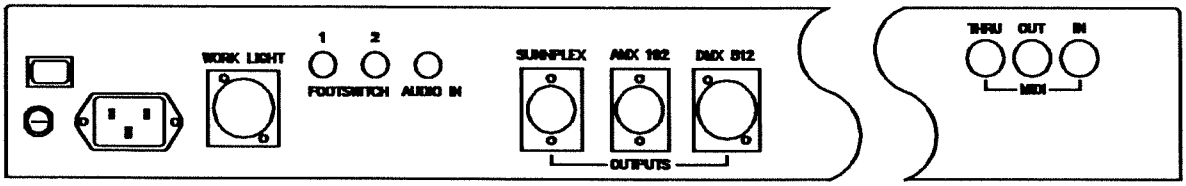


Fig. 1 Rear Panel

WORK LIGHT

This three pin female XLR jack is where you plug in the gooseneck lamp provided with the PLC 3200. If the lamp provided is too dim for your work you can replace the bulb with a high intensity 5 Watt bulb. The bulb is only available from CAE (Tel. 313-231-9373), part no. Q-5.

FOOTSWITCH JACKS

These two phone jacks are for the footswitches provided with the PLC 3200. They accept momentary, normally open type switches which short out the two conductors of the jack. The functions of the footswitches are programmable. Consult the Special Functions Menu section in this manual on how to program them.

AUDIO IN JACK

In order to drive the audio sync special effect and also the audio chase, an audio signal must be patched into this phone jack. Line level signals are most effective. These include outputs from mixing consoles, drum machines, etc. Generally, lower frequency audio signals produce more noticeable results when driving lights.

When using a balanced source, such as the balanced output of a mixing console, a balanced to unbalanced transformer (Shure type A95UF) should be used to convert to an unbalanced signal needed by the sync input. Only shielded audio cable should be used between the audio source and the audio sync input jack.

OUTPUT JACKS

There are three different types of multiplexed lighting signals transmitted by the PLC 3200 each with its own connector on the rear panel. Any combination of these may be used to connect the PLC 3200 to dimmers or other lighting equipment. They are always active.

SUNNPLEX

Use this three pin male XLR jack to connect to a SUNN dimmer pack or the SUNN DEPLEX 216 using a standard balanced, shielded microphone cable. When interconnecting, you can daisy chain as many as 25 SUNN dimmer packs together by using mic cables from one dimmer to the next. If you find that a mic cord is too short to reach between two parts of your lighting system, you can link two cords in series to create a longer one. To do this, simply connect the male end of one cord to the female end of another. Repeat this with as many cords as necessary to arrive at the required length. In similar fashion an audio snake may be wired in series with a mic cord. Note however, that any cord used in this application must be wired properly. Pin 1 on the male connector must be connected to pin 1 on the female connector at the other end of the same cable, the same for pins 2 and 3.

CAUTION: Once a mic cable has been plugged into a dimmer pack, be certain that no microphone is accidentally plugged into the other end of the cable as this may destroy the microphone.

In order to utilize all thirty two channels of the PLC 3200, at least thirty two channels must be available on your dimmer packs. This is possible by using eight or more four channel dimmer packs. If you are connecting to two DEPLEX 216s, set one to channels 1-16 and the other to channels 17-32. If you do not need all thirty two channels you can use the PLC 3200 with fewer dimmer packs adding more as future needs dictate. All SUNN four channel dimmer packs are factory set to respond to channels 1-4. Therefore you will have to change the "addresses" of any dimmer packs you want to control from channels 5-32. Your dimmer pack operator's manual explains how this is done. The outlets on four channel dimmer packs are marked 1, 2, 3 and 4. If the dimmer pack is set up to respond to channels 1-4, the outlet markings correspond to the channels on the PLC 3200. If the dimmer pack is set up to respond to channels 5-8, then outlet 1 on that dimmer pack corresponds to channel 5 on the PLC 3200, outlet 2 to channel 6 and so on. Similarly, the dimmer pack addresses may be set so that outlets 1-4 correspond to channels 9-12 or 13-16. You may also opt to have more than one dimmer pack set to the same group of four channels. In many applications it is preferable to have more than one lamp per channel.

CAUTION: The AC outlets on the SUNN dimmer packs are ONLY for resistance type loads (e.g. quartz or incandescent lamps). DO NOT connect transformer or ballast type lamps (low voltage "rain lights," mercury, halide or fluorescent lamps) or anything other than lighting fixtures (guitar amps, fans, refrigerators, etc.) to the outlets. Extension cords, however, may be connected between the outlets and the lighting fixtures. FAILURE TO OBSERVE THE ABOVE PRECAUTIONS MAY VOID THE WARRANTY AND CAUSE DAMAGE TO THE DIMMER PACK AND TO THE CONNECTED EQUIPMENT. For non-dimmer type applications SUNN offers the Pro Rack ND 600.

When you plug the dimmer pack(s) in, you will obtain the best results if you adhere to the following rules:

- Use a power outlet located as close as possible to an electrical service panel (fusebox). It is best if that outlet is on a separate fuse or circuit breaker from your audio equipment.
- Always use quality 16 gauge (or heavier) grounded extension cords.
- Make certain that the rating of the breaker or fuse for the chosen outlet is adequate. The required rating (in amps) of the fuse or breaker can be calculated with the formula:

$$\frac{P}{I} = E$$

where I = the current (amps)
P = the power (watts)
E = the voltage (volts)

In a standard 120 VAC electrical system, 100 watts = 5/6 amp. A safe rule of thumb is to call 100 watts 1 amp. Thus, if you are using four 500 watt bulbs (2000 watts total), you should have at least a 20 amp service.

- **IMPORTANT!** Do not run any lighting power cords near sensitive audio cables (e.g. mic cords, guitar cords, snakes, etc.).

AMX 192

This four pin male XLR jack is used to interface to dimmers which accept this USITT standard multiplexing scheme. This signal is based on the Strand lighting system and can accommodate 192 lighting channels. The PLC 3200 only outputs channels 1-32. If you are patching into a system that is set up for more than the first 32 channels, you will have to re-patch the system at the dimmers to read channels 1-32 only, consult your dimmer manual for proper connection.

The PLC 3200 adheres to the standard pin assignment: PIN 1- Signal Common, PIN 2- Differential Clock True (Clock +), PIN 3- Analog Level (0-5 V), PIN 4- Differential Clock Complement (Clock -).

DMX 512

This five pin female XLR jack is used to interface to dimmers which use this USITT standard digital multiplexing scheme. This signal is designed to accommodate 512 dimmers. The PLC 3200 only outputs levels for dimmers 1-128 which can be soft patched to any of PLC 3200's 32 channels. Consult the section on soft patching for more information.

The PLC 3200 adheres to the standard connector pin assignment: PIN 1- Signal Common (Shield), PIN 2- Dimmer Drive Complement (Data -), PIN 3- Dimmer Drive True (Data +).

MIDI IN

This is the MIDI input jack. You would normally connect this to the output of a MIDI sequencer or MIDI controlling device. Consult the MIDI section of this manual to find out which functions are controllable via MIDI.

MIDI OUT

This is the MIDI output jack. You would normally connect this to the input of a MIDI sequencer in order to record scene or control changes. Consult the MIDI section of this manual for more information on using a MIDI sequencer.

MIDI THROUGH

The MIDI data at the MIDI input is duplicated here to allow daisy chaining of MIDI devices.

3 - CHANNEL CONTROLS

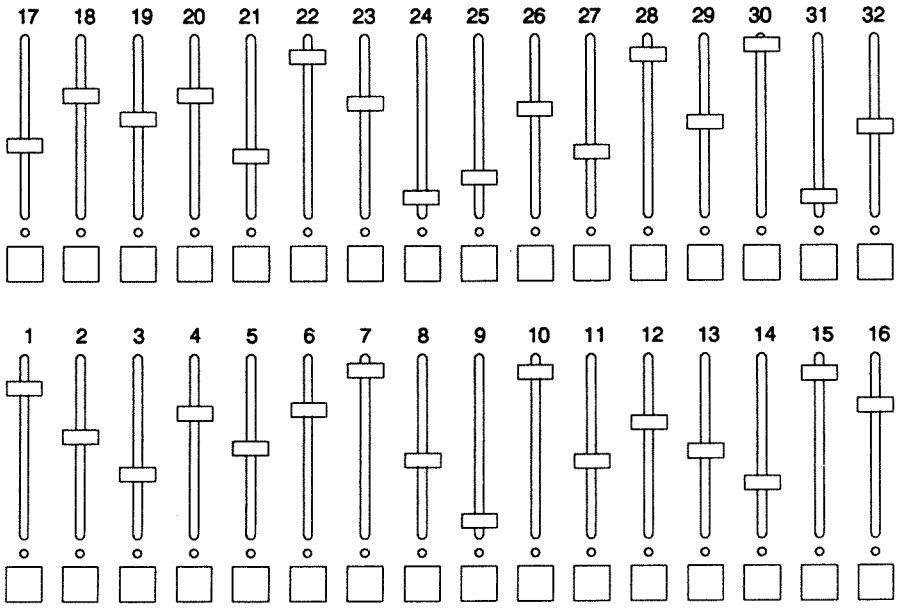
FADERS 1-32

Figure 2 shows the faders labeled 1-32 which occupy the largest portion of the front panel of the PLC 3200. These thirty two faders are in two rows and are labeled 1-16 on the bottom row and 17-32 on the top row. They serve two functions, first as channel faders and second as sub masters. The "Scenes 1-32" switch is used to select between the two modes of operation.

When configured as channel faders, each fader corresponds to one lighting channel. A channel fader determines the relative brightness of any lamps that are connected to that particular channel. The channel faders are used to create a "scene" which is a group of 32 channel levels. This scene can then be stored in memory for later recall during a performance. (The memory store process is explained in a later chapter). As sub masters each fader can be used to control an entire scene. In this mode of operation faders 1-32 correspond to scenes 1-32 in memory. This is explained in greater detail in the following chapter on sub master controls.

While in channel mode, moving a channel fader causes several things to happen. First any lamps connected to that channel immediately begin to follow the movement of the slider. (NOTE: The Grand Master must be set to a high enough level to allow any lamps to be affected). Also the decimal point in the "Now" display will light up. This indicates that the current scene has been modified from its stored value. The decimal point is only a reminder to

Fig. 2 Channel Controls



show you that the active scene on stage is a modified version of the scene stored in memory. MIDI information is also sent whenever a slider is moved. This allows you to record individual channel fader moves with a MIDI sequencer for automated lighting control.

SWITCHES 1-32

Below each fader is a switch and LED. These switches normally act as flash or "bump" buttons. In channel mode, pressing one of these switches causes the intensity of the selected channel to be bumped up to its maximum level determined by the level of the Flash Master and Grand Master faders. Pressing one of these switches while In sub master mode causes the corresponding scene to be brought up to full intensity. The switches are also used for various programming functions such as audio sync assignments and soft patching. This is covered in detail in the sections following.

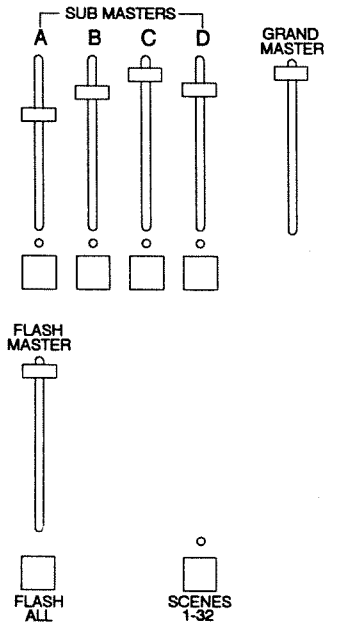
Pressing a flash switch will send MIDI information allowing you to record flashes with a MIDI sequencer when doing automated lighting. The channel's LED will flash whenever the channel is flashed either from a switch press or from MIDI being received.

Switches 29-32 are highlighted and can be configured to operate as special effects switches. As such these channels can be assigned to controlling non-lighting type effects like relays which turn on flash pots, motors, or fog machines. Consult the special functions section of this manual for details on how to use them this way.

4 - MASTERS

Figure 3 shows Sub Masters A through D, the Grand Master and the Flash Master. The Scenes 1-32 switch and LED which is used to enable sub masters 1-32 is also shown here.

Fig. 3 Masters



SUB MASTERS

There are four programmable sub masters labeled A, B, C, and D. Each has a fader, a switch, and an LED. Faders 1-32 can also be used as sub masters which gives you a total of 36 sub master faders to work with during a performance. You can assign any scene number to subs A-D but subs 1-32 are permanently assigned to scenes 1-32.

The subs operate in a "pile on" fashion. They are used to bring up the levels of the scenes that are assigned to them. A sub is usually left in its off position then raised in order to call up a scene. Pile on means that when more than one sub is raised the different scene levels are added or "piled on" to each other allowing up to 36 scenes to be on at one time. If channels are shared between scenes the scene with the highest level for that channel will prevail.

Before you can use any of the sub masters you must of course create some scenes and store them in memory. This is explained in detail in chapter 6. Once you have a scene created and stored you can assign its scene number to one of the four sub masters A-D. Any scene that is assigned to numbers 1-32 can be called using sliders 1-32 when they are set to sub master mode. Sub master mode is enabled by pressing the switch labeled "SCENES 1-32". The lit LED indicates that faders 1-32 are now sub masters. You can switch back and forth between sub master mode and channel mode at any time. Any sub masters that are active will remain

on when the SCENES 1-32 LED is off, you just won't be able to adjust the sub master levels until you switch back to sub master mode.

The flash switches for each sub master can be used to bump a scene up to its full level. The switch must be held down to maintain the flash. The flash switches are also used for programming chase sequences and for assigning scenes to subs A-D.

The sub masters are used to call scenes which contain fixed lamp levels. As is explained in a later chapter, a scene can also be programmed as a chase sequence or be controlled by an audio input. These types of scenes are ignored by the sub masters. A chase scene or audio sync scene can only be called by using the keypad and the "GO" switch.

ASSIGNING SUBS A-D

You can assign any scene number from 1 through 99 to subs A, B, C, or D. You should of course have a scene at that location before assigning it to a sub master. To assign a scene number, first press the "Store" switch. The scene number in the "Now" display will flash. Next press one of the four sub master switches (A-D) that you want to program, its LED will begin to flash also. Next select the scene number you wish to assign by using the 9 digit keypad. The number will appear in the "Now" display. Finally press and hold the "Store" switch until the display stops flashing. The sub assignment is stored in the back-up memory along with scene information so it won't be lost when the power is turned off.

To remove a scene assignment from any of subs A-D you can either assign a new scene which will overwrite the old one or you can turn the sub assignment off by assigning scene 00 to the sub.

You can view the current scene assignments for subs A-D from one of the menu selections in the special functions menu explained in chapter 11.

GRAND MASTER

The Grand Master controls the overall intensity of the entire system much like a master volume control does on an audio console. When moved, the Grand Master fader will adjust the levels of all the lights in the system but still maintain the relative levels between individual channels. All sub masters as well as the Flash Master are subject to the Grand Master.

FLASH MASTER

The Flash Master determines the intensity of a channel when it is flashed from a switch press or from a chase. The flash switches affected include the individual channel switches and the Flash All switch located directly below the Flash Master fader. The brightness of the lamps being flashed will also be affected by the level of the Grand Master.

5 - AUDIO SYNC

AUDIO SYNC SWITCH

This switch enables or disables the audio sync effect. There is an LED above the switch to indicate when audio sync is on. When enabled, the intensity of the audio signal present at the audio jack on the rear panel is added to the intensity of the light channels to which the effect is assigned. Audio sync is a "pile on" type effect, which means that the lights are only made brighter by the amount of audio signal added and never dimmer than their current set levels. So in order to see the effect, the lights cannot be at or near full intensity since they can't be forced to go any brighter by the audio signal.

You can assign which channels you want to send the audio to. Press the audio sync switch down and hold it. The LEDs for the channels currently assigned will light. Use the channel switches to toggle the individual channel LEDs on or off.

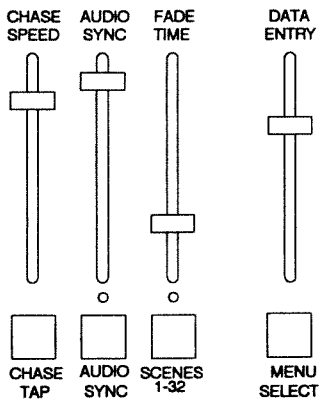
This effect along with the individual channel assignments can be stored as part of a scene when it is saved to memory. Whenever that particular scene is recalled later, the audio sync LED will light indicating that it's active. The level of the audio sync fader is not stored.

For the most dramatic effect, use a low frequency or pulsing type audio source such as a drum machine and set the light channels to a low intensity or off. Adjust the output from the audio source and the audio sync fader for best results. The lights should follow the level of the audio. Also remember that the effect may be scaled by the Grand Master.

AUDIO SYNC FADER

The audio sync fader determines the gain of the audio signal which is present at the Audio In jack on the rear panel. This is a manual control and does not send or receive MIDI. With audio sync enabled, adjust the source level of the audio along with this control to get the optimum effect on the lights.

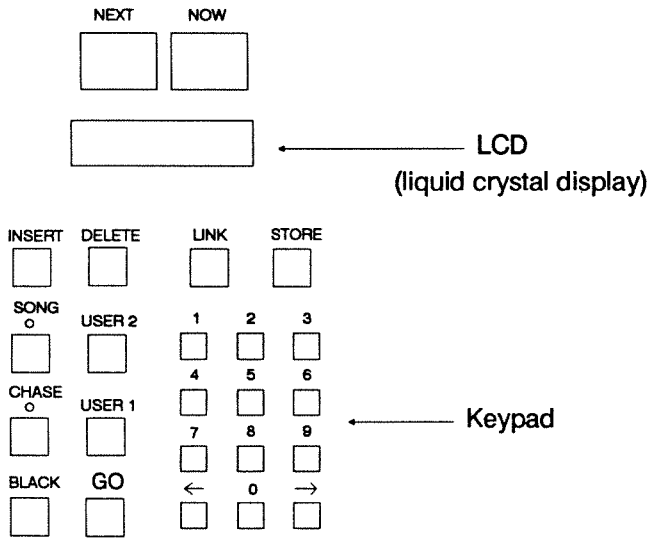
Fig. 4 Effects Controls



6 - SAVING AND RECALLING SCENES

Once you have created a scene either by setting the individual light channels to different values or by creating a chase sequence (covered in the next chapter), you will want to save it to memory. Once it has been saved it will always be available for later recall until you later edit it or overwrite it with a new scene. Decide what number you want to assign the scene before creating it. Make sure that the number is not being used for something you want to keep. Once you save a scene at a particular scene number, whatever was there before will be overwritten and lost.

Fig. 5 Scene Control and Displays



STORE

To save a newly created scene first press the "Store" switch. Press it quickly without holding it down, you will see the reason for this in a moment. The number in the "Now" display will flash telling you that you are in store mode. At this point you can adjust the fade time by moving the Fade Time slider. The fade time that you store with the scene is the time it will take to fade into the scene from the current scene (0 to 10 seconds). Fade time only applies when using the Go switch to call a scene. If you are storing a chase, you should adjust the chase speed. The amount of fade time or chase speed will be displayed on the top line of the LCD (liquid crystal display). You may also at this time enter a name for the new scene. Use the data entry slider to select characters and the left and right arrow keys to move the underline cursor. A name can have up to twelve characters. Next, with the numeric keypad select the number that you want to assign to the new scene. The number will be displayed in the "Now" display as you select it. Once you have selected the number, press Store again and hold it down for 1 second. When the "Now" display stops flashing, the scene is saved.

You can abort the store process at any time by pressing Store again without holding it down for one second. You will leave store mode and "Now" will stop flashing.

EDIT

Once a scene is saved, you can quickly edit it or just touch it up. Simply call the scene, make any adjustments to the levels or other values, then press the store switch and hold it for one second. When the "Now" display stops flashing your edits will be written into memory.

COPY

To copy one scene to another, simply call the scene you want to use, press store, select the destination scene number with the keypad, then press and hold store for one second.

SCENE MEMORY

The following items are saved along with your scene; the name, whether or not audio sync is on or off, the audio sync channel assignments, whether it is a regular scene or a chase scene. If it is a regular scene it will contain individual channel levels and a fade time. If it is a chase scene it will contain the chase elements (up to 32 steps), the chase speed source (internal, MIDI, or audio), the chase speed, and the number of chase cycles. The Grand Master, sub masters, and Flash Master are not saved. These levels are maintained manually.

NOTE: You cannot write to scene 00. This scene number is reserved as the "black" scene.

RECALL

During performance you will need to recall the scenes you have stored in memory at the proper cue points. That is where the two large numeric displays labeled "Next" and "Now" come in. "Now" displays the scene number of the scene that is currently active. "Next" displays the scene that will be called whenever you press the Go switch. As an additional reference, the LCD will show the names of the next scene and now scene.

As explained in chapter 4, the sub masters can also be used to recall scenes.

KEYPAD

To select which scene will be called next use the numeric keypad to select the scene number. The value in the "Next" display will reflect your selection as well as the top line of the LCD. The keypad generally requires you to enter two digits. For scene numbers 0-9 you can enter just a single digit but the LCD will not show the name of the next scene. You can continually change the next scene selection with no visible change on stage. The scene is not called until Go is pressed.

GO SWITCH

When you reach a cue point during a performance, pressing the Go switch calls up the scene in the "Next" display. The Go switch is touch sensitive, a long press (hold switch down about 1 second) calls the scene using the stored fade time and a short press calls the scene in-

stantly with no fade time at all. Experiment with short and long presses in order to get the feel of how long you need to hold it down. The decimal points in the Next and Now displays will flash during the crossfade.

After the new scene is called, "Next" is automatically incremented by one. You may of course select any scene number you want at this point but by automatically calling the next consecutive scene, the PCL 3200 lets you step through a sequential cue list by simply pressing Go at each cue.

Go will also send a MIDI program change command so that you can record and play back scene calls with a MIDI sequencer for automated control.

FADE TIME SLIDER

The time it takes to fade into the selected scene is usually the fade time that you stored when you first saved the scene in memory. You can override the stored fade time by selecting a new fade time with the Fade Time slider just before hitting the Go switch. The decimal point in the "Next" display will light up to tell you that the fade time was temporarily changed from the stored value.

The scale next to the Fade Time slider is in seconds. Moving the slider during a fade will speed up or slow down the fade as it is happening. MIDI data will also be sent whenever the slider is moved.

Chase scenes always start instantly with no fade time used.

7 - CHASE

Chase sequences are programmable and can be stored in memory as a scene. A chase sequence is made up of steps. Each step can be either a channel flash, a sub master flash or a scene flash (sub master and scene flashes are essentially the same). You can have up to 32 steps in a chase.

When the chase is running, the PLC 3200 will flash each step in order and at whatever speed you program it for. You may also choose to control the chase speed from MIDI clocks or from an external audio source. Consult the special functions chapter for details on how to program the chase source.

CREATING A CHASE

To create a chase sequence first press the Chase switch. The red LED above it will flash. This means that chase is recording. Now you can start entering the elements that you want your chase to be composed of. To add a channel flash, press a channel flash switch. Make sure the "Scenes 1-32" switch is off and the flash master fader is up. To enter a sub flash, press a sub A-D flash switch or turn on the "Scenes 1-32" switch and press one of the 32 flash switches. You can also enter a scene number directly into the chase by selecting the scene number with the numeric keypad (it will be displayed in "Next"), then pressing the Go switch. Whenever you select one of these three elements it will be added to the end of the chase sequence. If you decide you don't like the pattern, press the Black switch and everything is returned to zero. You can then start over.

The red Chase LED will always be lit when a chase is running. It will flash when chase is in record mode. If you press the Chase switch while the LED is lit and hold it down for one second, the LED will start to flash enabling record mode allowing you to add to or edit the chase that is currently running. Pressing the Chase switch while the LED is flashing will turn off record and the chase will continue to run. Pressing the chase switch again (chase running but not in record mode) will turn the chase off. The chase can also be turned off by pressing the Black switch or by calling another scene.

CHASE SPEED

To control the speed of the chase, you can use the Chase Speed slider or use the Chase Tap switch directly below it. Tap lets you tap in the exact tempo of the chase flashes. If you would like to control the speed from MIDI or from audio, call the special functions menu and select the desired chase source. Consult the special functions section for details.

STORING THE CHASE

You must store your chase in memory if you want to be able to call it up later, otherwise it will be lost when you call a new scene. Store it the same as you would a regular scene; press Store, select the scene number you want to save it to, then hold Store for one second. To remove it from memory, simply record another scene over it.

CHASE TAP

Once a chase is stored in memory its tempo can be pre-loaded with the Tap switch provided the chase uses the internal clock and not MIDI or audio as its speed source. This means you can tap in the tempo before calling the chase so that when it starts it will be in sync with the music. To do this call up the chase scene as the Next scene with the keypad. Start tapping the tempo with the tap switch (only two hits are required). The decimal point will light in the Next display showing you that the tempo has been modified. When you press Go, the chase will start at the tempo that you pre-loaded. You can adjust the tempo with the Tap switch while the chase is running at any time. Pre-loading doesn't work when there is a chase currently running. The Chase Tap will always control a currently running chase if one is active.

The Chase Tap function will also send and receive MIDI.

NOTE: The maximum allowed time between taps is 2 seconds. Any interval longer than that will be ignored.

PROGRAMMING HINTS

The most powerful chase tool is the scene chase. By using scenes as chase steps you will get a very dramatic effect as all of the lights can change with each step. You can also mix scenes with individual channel and sub flashes in the same chase sequence.

When chasing scenes you may want some lights to flash while others remain the same. For example you may want the lights at the front of the stage to remain fully lit while you step through three different colors with the lights at the back of the stage. To do this you need to create and store three different scenes. Scene 1 will have all of the front lights at full with only the blue lights on in back, scene 2 will have all front lights on and only the red on in back, and scene 3 will have all front lights on and only the green on in back. Next write a chase sequence that contains scenes 1, 2, and 3 as the three chase steps. It is important to understand that for each step of a scene chase you must create the exact look that you want at each step.

When creating a chase pattern from single channel flashes, you will probably want to chase some channels while others remain at some constant level. As in our previous example, you may want all front lights to remain on while you chase through the individual lights at the back of the stage. To do this you must first call a scene that sets the front light levels then call a scene that chases the back lights. Two scenes are required because the PLC 3200 can store a scene as a regular scene (a configuration of light settings) or as a chase pattern. It cannot store a combination of both. One thing you can do is link the two scenes together. This lets you call the two scenes in our example with a single press of the Go switch. Consult the section on Link for more details.

Probably the best way to keep some channels on while others are chasing is to bring up a sub master which controls those channels. A sub master won't be affected by the chase and can be used to override any chase flash.

8 - ADDITIONAL CONTROLS

BLACK SWITCH

This switch does exactly what it says. It brings all channels to zero (off). By pressing Black you are calling scene number 00 which is the blackout scene. Like the Go switch the Black switch is touch sensitive. If you press and release the switch quickly the channels will go to black instantly. If you press and hold the switch momentarily (about 1 second) the scene will fade to black at the rate determined by the Fade Time slider (from 0 to 10 seconds). Since you cannot write to scene 00, pressing Black or calling scene 00 always uses the fade time that the Fade Time slider is currently set to. If you want to program the fade time for a black-out, copy scene 00 to another scene number and store a fade time with it. You may want to store several black scenes with different fade times and under various names like "FAST BLACK" OR "SLOW BLACK". This will give you more control from a MIDI sequencer since the blackout will now have a known fade time.

Black also turns off any currently active sub masters so that all levels can be brought to zero.

Pressing Black will send a MIDI program change calling program number 00.

USER SWITCHES

There are two user programmable switches provided, User 1 and User 2. These give you instant access to scenes which are used most frequently. They can also be used as panic buttons if you become lost in your show. A user scene is just like any other scene except that it saves you the trouble of having to select a number and press Go.

To create a User scene, either call an existing scene or create the scene you want. To store it, press Store as usual then press User 1 or User 2 instead of selecting a scene number. "U1" or "U2" will appear in "Now". You may at this point enter a new name in the LCD. Hold down Store for one second as you normally would to save a scene.

The user switches are touch sensitive just like the Black and Go switches. They also send MIDI program change commands (programs 100 and 101) so that you can record them with a MIDI sequencer.

DELETE SWITCH

This switch is used with Song mode to delete a step within a song sequence. It is also used to delete a link from a scene and also used when step editing a chase. Consult the sections in the manual regarding each of these operations for more information.

INSERT SWITCH

This switch is used to insert a step into a song sequence as well as when step editing a chase. Consult those sections in this manual for more information.

LINK SWITCH

Link allows you to link or chain scenes to each other. By linking scene 04 for example to scene 02, the PLC 3200 will automatically jump to scene 04 after scene 02 is finished fading. This gives you a way of executing complex lighting changes with a single press of the Go switch. It also allows you to achieve longer fade times by chaining several long fades together. If you are linking from a chase scene you can even select the number of times that the chase sequence will cycle before calling the linked scene. You can link as many scenes as you want since each scene can have its own link. You can even link scenes in a circle causing the chain to run continuously. For example link scene 04 to 02, then 08 to 04, then 02 to 08, which would make scenes 02, 04 and 08 run one after the other continuously whenever scene 02 was called.

To link another scene to the scene you currently have in "Now", select the scene you want to jump to in "Next". Press and hold the Link switch for one second. The "Next" display will flash once to tell you that the link is stored. The LCD will also show the link in the top line whenever a scene with a link is in "Now". To remove the link, press Delete and Link at the same time and hold for one second. The "Next" display will flash once when the link has been removed. NOTE: You cannot jump to Scene 00 or to User 1 or User 2 in a link.

Whenever you have a scene with a link, that scene must have a reasonably long fade time otherwise the first scene will fade in so fast that you'll never see it before its link is called. Also whenever a chase scene is to call a link you'll want to program the chase for a fixed number of cycles, otherwise the chase will run forever and never call the link. This is done from the special functions menu. Consult that section for more details.

If you want a scene to hold before fading automatically into the next linked scene you must first store a duplicate copy of that scene at another number and set its fade time to the length of time you want it to hold. By linking a scene to a copy of itself the fade time will simply hold the lamps on stage to their current levels. This will allow you to hold for up to ten seconds which is the maximum fade time. For longer holds you must make additional copies and link them in sequence as well.

A potential problem can arise when you want to remove a link from a scene. The problem is actually being able to delete the link before it gets called. You must first call a scene before removing its link. If the link gets called before you have time to press the Link and Delete switches you can't remove it. To get around this problem, a normal scene, that is a non-chase scene will ignore its link whenever you call the scene instantly by pressing the Go switch quickly. So to erase a link, call the scene first with a quick press of Go then remove the link by holding down the Link and Delete switches together for one second. If the scene is a chase scene you will have to remove the link before the chase completes its number of programmed cycles. To give yourself more time, you can always slow the chase down by pulling the Chase Speed slider to its lowest setting.

Storing a scene to memory does not affect its link. Whenever you copy a scene from one location to another, the link if any will not be copied. Likewise if you copy over a scene that already has a link, the link remains. You must delete the link using the Delete and Link switch.

9 - SONG MODE

Song mode is ideal for someone who needs to step through an entire light show with a footswitch. With the song function you can store series of scene numbers in random orders called songs. You can have up to 50 songs with each song containing up to 50 scenes. Anyone who has used a drum machine will probably recognize this concept.

To enter song mode, press the Song switch. The LED above the switch will light and the top line of the LCD will change to indicate the current song number and the current step number. The bottom line of the LCD will continue to show the name of the "Now" scene. When you first turn on song the LCD will display "SONG 01 STEP 00" in the top line and "START OF SONG" in the bottom line. This means that you are ready to enter song number one. At this point you may either select a different song number, select a different step number, or go ahead and begin the song. If you are using Song mode for the first time, all of your songs will be empty so you will have to begin by creating a song.

In song mode the "Next" and "Now" displays will continue to function as before except that "Next" will show the scenes that are next up in the song list. The letters "En" that appear in "Next" and "Now" stand for end of song.

Unlike in normal operation where the keypad is used to select a scene number for the next scene, in song mode the keypad is used to select either a song number or a step number. To select a new song, use the left arrow key to put the underline cursor underneath the song number in the LCD. Enter a two digit number to select a song number (01 to 50). The PLC 3200 will immediately jump to the start of the selected song. No new scene will be called though until you actually call step 01 of the song by pressing Go.

You can jump to any song step within the current song by using the right arrow key to put the underline cursor under the step number then selecting the desired step number with the keypad. If you select a step number that is beyond the end of the song, the PLC 3200 will jump to the end of the song instead. The scene at the step you call will be displayed on stage instantly unless the step is the "end of song" step.

Pressing Go when in song mode calls the scene in "Next" as in normal operation. The big difference is that after pressing Go, "Next" becomes the next step in the song sequence rather than the next consecutive scene.

WRITING A SONG

A song is only a list of scene numbers so you must first create the scenes before creating the song. When entering a series of scene numbers into a song for the first time it is often helpful to work from a prepared list. That way you can simply enter the scene numbers step by step into the song right off the list. Once entered, there are facilities provided for quick editing.

When you call up an empty song, step 01 will be the "end of song" step. To begin entering scene numbers, go to step 01 if you're not already there by pressing the Go switch. "En" will

be displayed in "Now". Press the store switch once. "Now" will start to flash indicating that step 01 is ready to record. Select the scene number you want to place at step 01 by using the keypad. The "Now" display will show the selected scene number. If you have lights connected, the lights will also change to show your selection. Hold down the Store switch for one second. After the step has recorded, step 02 will automatically be called and "Now" will display "En" indicating that the end has now been moved up to step 02. "Now" will remain flashing telling you that it is ready to record the next step in the song. You may continue recording scenes this way until you have entered all of the scenes for this song (up to 50). When you are finished, press Store quickly and you will exit song record mode.

To abort the song store process at any time, simply press Store quickly and "Now" will stop flashing.

CHANGE SCENE NUMBER

To change the scene number stored at a particular step first go to that step, then hit Store with a quick press. "Now" will flash indicating that it's ready to record. Select the new scene number with the keypad then press and hold Store for one second. When "Now" stops flashing, the new scene has been recorded.

NOTE: Whenever you are recording over the "end of song" step, the current step number will increment automatically following the store and you will remain in record mode. This allows you to continue to add to the end of a song and makes it convenient for entering a list of scenes at the end of a song or for creating new songs. If you are writing over a step in the middle of a song, you will leave record mode after the new scene number is written. "Now" will stop flashing to tell you that the new scene has been recorded.

DELETE STEP

To remove a step from a song, go to that step, then press Store to get into record mode. Press and hold the Delete switch for one second. The scene at that step number will be removed and all the scenes in the following step numbers will be moved down one step to fill the space. "Next" and "Now" will change to reflect the new scenes at the current and next step. After deleting a step, the PLC 3200 remains in record mode so that you can delete more steps if you wish. To exit, press Store quickly once again to leave record mode.

INSERT STEP

To insert a new scene into the beginning or middle of an existing song, first go to the step in the song where you want the new one to be added. If you are adding a new step to the beginning of the song go to step 01. Enter record mode by pressing Store. Press Insert and "__" will appear in the "Now" display. This tells you that the step is ready for a new scene to be inserted. You may abort the insertion process at any time by leaving record mode or by pressing Insert once again. Select the scene number for the new step you want to insert with the keypad. Once selected, hold down Store for one second. When "Now" stops flashing the insertion is complete and all subsequent scenes in the song order will be moved up one step to accommodate the new one. If the song happens to be full when you make the insertion, the last scene at the end of the song will be shoved off the end of the earth and lost from that song.

10 - MIDI

With MIDI you can do the following; record your performance (fader moves, switch presses, special effects, etc.) with a MIDI sequencer and play them back giving you automated control over your lighting, control your lights from another source such as a MIDI keyboard or percussion controller, transfer the memory from one PLC 3200 to another or to a computer for backup storage.

NOTE: This manual does not attempt to fully explain MIDI to the first time user.

If you've never used MIDI before here is a very brief description of what it does. It provides a digital interface for connecting one MIDI instrument to another MIDI instrument by means of a single MIDI cable. What happens after they are connected depends a lot on the particular instruments you're using and how they were designed to use MIDI. For the most part, MIDI was designed to transfer musical performance information, especially information related to synthesizers (e.g. note on, note off, control change, etc.). Fortunately this same information format lends itself easily to instruments like the PLC 3200 lighting controller.

MIDI, like audio, requires separate lines for input and output. If you are working with a MIDI sequencer, you will want to connect the MIDI out of the PLC 3200 to the MIDI in on the sequencer and the MIDI out of the sequencer to the MIDI in on the PLC 3200. If you are only controlling the PLC 3200 from a remote MIDI source such as a keyboard, you only need to connect the MIDI in on the PLC 3200 to the MIDI out of the controlling device. The MIDI through jack on the PLC 3200 enables you to daisy chain other MIDI instruments to the incoming MIDI signal. To do so, connect the through jack to the MIDI in of the next device in the chain.

MIDI provides sixteen separate channels to send and receive on. All sixteen channels are sent down the same cable so generally you must assign different MIDI instruments their own MIDI channel whenever you have more than one instrument in your system. This is often necessary when using a MIDI sequencer. The MIDI channel assigned to the PLC 3200 can be set from the special functions menu. Consult that chapter for more details.

MIDI COMMANDS USED

The PLC 3200 makes use of MIDI program changes, MIDI controller commands, MIDI switch on/off commands, MIDI timing commands, and MIDI note commands. It also uses MIDI system exclusive messages to transfer its memory contents. A list of the MIDI messages that are sent and received by the PLC 3200 is given at the end of this chapter.

FADER CONTROLS

MIDI allows for the transmission and reception of slider type controls through the use of continuous controller commands. These commands assign a number to a given control. With the PLC 3200, each light channel is given its own MIDI controller number. The MIDI controller numbers used are 16-31 for channel faders 1-16 and MIDI controller numbers 48-63 for

channels 17-32. Controller numbers 8-11 are assigned to sub masters A-D, controller numbers 32-47 are assigned to sub masters 1-16, controller numbers 64-79 are assigned to sub masters 16-32, controller number 12 is assigned to the flash master, controller number 13 is assigned to the grand master, controller number 14 to the fade time slider, and controller number 15 to the chase speed slider. The level for each control can vary from 0 (off) to 127 (maximum).

MIDI NOTES

Channels 1-32 can also be programmed to respond to specific MIDI notes. For example you can program channels 1-4 to respond to middle C and channels 5-8 to respond to a D# one octave above middle C. The PLC 3200 does not send notes however. The velocity of the received note determines the brightness of the light. One of the special functions allows you to assign a particular note to each channel. Consult the special functions chapter for details.

SWITCHES

MIDI also allows for the transmission and reception of switch presses and releases. The PLC 3200 assigns MIDI controller numbers to the following switches. Chase tap uses number 85, sub master switches A-D use numbers 86-89, sub master switches 1-7 use numbers 1-7, sub master switches 8-32 use numbers 96-120, special effects switches 29-32 use numbers 90-93, Full Flash uses 94, and Audio Sync uses 95. MIDI switches send a value of 127 for on and 0 for off.

Because of a shortage of available MIDI controller numbers, the channel flash switches transmit and receive MIDI note on messages when faders 1-32 are configured for channel mode. The MIDI notes used are notes 0-31. The PLC 3200 transmits a note velocity of 0 for switch release and a velocity of 127 (maximum) for switch press.

SCENE CHANGES

MIDI allows for transmission and reception of program changes. The PLC 3200 uses program change commands to send and receive scene changes through MIDI.

MIDI TIMING

In order to sync MIDI instruments to each other while playing music, MIDI can send and receive clocking data as well as several other types of timing information. The PLC 3200 will accept MIDI clocks, start, and stop commands to control the chase speed. To do this, you must program the particular chase scene to use MIDI as its timing source. This is done from the special functions menu as described in the next chapter. You can program the chase to flash at whole note, half note, quarter note, eighth note, and sixteenth note intervals by moving the chase speed slider.

USING A MIDI SEQUENCER

MIDI sequencers from different manufacturers vary in their number of features and their ease of use. Become familiar with the one you are using before attempting to use it with the PLC 3200. All MIDI sequencers do have one thing in common though, they record MIDI informa-

tion and then play it back, hopefully in sync with the time reference that the information was recorded with. If you plan to record more than just scene changes, your sequencer must be able to record and playback MIDI continuous controller messages.

With the PLC 3200 you can record scene changes, any slider move except the Audio Sync slider, and the following switch presses: Chase Tap, channel flashes, special effects, sub master flashes, Audio Sync, Full Flash, User 1 and 2 (recorded as program changes), and Go (also recorded as a program change).

When playing back the recorded MIDI information into the PLC 3200, the lights will respond accordingly. One important thing to remember though is that the Grand Master scales all lighting signals whether they are from actual slider moves or from MIDI. That means that if you record your channel slider moves then adjust the Grand Master during playback, the overall intensity of all the lights will change. They will still retain their relative intensities to each other though. Remember also that the Grand Master can be recorded by the sequencer as well. If you record the Grand Master going from full to zero, on playback all lights will go to zero and stay there until the Grand Master is returned to a higher level. The actual Grand Master fader may be all the way to the top but since MIDI told the PLC 3200 to go to zero, that's where its actual level will be until it is changed either manually by moving the fader or from MIDI telling it to go back up.

PROGRAMMING HINTS

It's best to give the PLC 3200 its own MIDI channel while sequencing especially if there are other MIDI instruments being driven by the same sequencer. The MIDI channel on the PLC 3200 is set to channel 1 at the factory but you can change it from the special functions menu. Consult that chapter for more information.

The simplest type of lighting sequence would be a recording of scene changes at appropriate cues in a piece of music. This only requires selecting a scene in "Next" and hitting Go at the right spot while recording. Since scene changes are recorded as MIDI program changes, you can see why a separate MIDI channel for the lights is a good idea. You wouldn't want your synthesizer changing programs each time you hit Go.

If your sequencer allows multi-tracking, a separate track for the lights is also a good idea. If your sequencer also allows merging of tracks a good method of recording complex light changes is to use two tracks, one as a "scratch" track and the other as a "keeper" track. You start by recording as many moves as you can comfortably execute on an empty track. This will be the keeper track. You then add more changes by recording them on to the scratch track and then merge or "bounce" them over to the keeper track only when you have them right. This way you don't have to try to do everything in one pass and you can take the time to get each pass right "piling on" to the keeper track only when the moves are right. This method is good for recording lots of musically synced flashes that you normally couldn't execute with one pass in real time.

USING A MIDI CONTROLLER

If you're controlling the PLC 3200 from a MIDI keyboard or some other type of MIDI controller you have several options. You can use MIDI control change messages to control the level

of the individual light channels or you can use MIDI note numbers. The notes that the PLC 3200 will respond to are programmable from the special functions menu described in the next chapter. It is programmed from the factory to respond to middle C for channel 1 then incrementing by half steps for the rest of the channels. The velocity of the note determines the brightness of the light (as scaled by the Grand Master). A note off (release) will turn the light off. Be sure to allow a note of sufficient duration to turn the light on. Quick notes won't be noticed because of the time it takes for the lamp filaments to come to the desired intensity. If you are using a percussion controller to drive the lights from a MIDI drum set for example, program the desired PLC 3200 channels to respond to the notes that the drums send. If the drums will send velocity information the intensity of the hit will determine the brightness of the flash. If possible program the drums so that they send a note off after a long enough time following the note on to achieve the desired length of flash.

Another possible use would be to control lighting functions from a MIDI keyboard controller. If the controller has programmable sliders or pedals, you can control the Grand Master, Chase Speed, or individual light channels from your MIDI keyboard. You could also call scenes by making program changes from the keyboard.

DUMPING THE MEMORY

The PLC 3200 allows for memory transfer via MIDI system exclusive messages. A memory dump is initiated from the special functions menu. Consult the next chapter for more information.

You can use the memory dump function to transfer the contents of one PLC 3200 to another or you can transfer to a computer for storage to disk. You must have special software and a MIDI interface for your computer to do this. A generic "MIDI dump" program will work nicely. Follow the instructions for your dump program that explain how to record a memory dump that is initiated from the source. When the computer is set to record the dump you will start it from the special functions menu of the PLC 3200. To load the data back into the PLC 3200 simply send it from the computer. The LCD will show the message "DATA RECEIVED" in the bottom line if the data was received correctly. The message "DATA ERROR" will be displayed if incorrect data or interruptions occurred. The system exclusive data format is included at the end of this chapter.

MIDI DATA FORMAT

NOTE: All numbers are expressed in hexadecimal unless stated otherwise.

TRANSMITTED AND RECEIVED DATA:

Sub Master 1 Flash	Bn 01 vv	(n = MIDI channel 0 - F)
. .	.	(vv = slider position 00 - 7F)
. .	.	
Sub Master 7 Flash	Bn 07 vv	
Sub Master A slider	Bn 08 vv	
Sub Master B slider	Bn 09 vv	
Sub Master C slider	Bn 0A vv	
Sub Master D slider	Bn 0B vv	
Flash Master slider	Bn 0C vv	
Grand Master slider	Bn 0D vv	
Fade Time slider	Bn 0E vv	
Chase Speed slider	Bn 0F vv	
Light Channel 1	Bn 10 vv	
. .	.	
. .	.	
Light Channel 16	Bn 1F vv	
Sub Master 1 Slider	Bn 20 vv	
. .	.	
. .	.	
Sub Master 16 Slider	Bn 2F vv	
Light Channel 17	Bn 30 vv	
. .	.	
. .	.	
Light Channel 32	Bn 3F vv	
Sub Master 17 Slider	Bn 40 vv	
. .	.	
. .	.	
Sub Master 32 Slider	Bn 4F vv	
Chase Tap Switch	Bn 55 vv	(for switches vv = 00 or 7F)
Sub Master A Flash	Bn 56 vv	
Sub Master B Flash	Bn 57 vv	
Sub Master C Flash	Bn 58 vv	
Sub Master D Flash	Bn 59 vv	
Special Effects 29	Bn 5A vv	(special effects must be enabled)
Special Effects 30	Bn 5B vv	
Special Effects 31	Bn 5C vv	
Special Effects 32	Bn 5D vv	
Full Flash Switch	Bn 5E vv	
Audio Sync Switch	Bn 5F vv	
Sub Master 8 Flash	Bn 60 vv	
. .	.	
. .	.	
Sub Master 32 Flash	Bn 78 vv	

Channel 1 Flash	9n 00 vv	(7F = press, 00 = release)
. .	.	
. .	.	
Channel 32 Flash	9n 1F vv	
Scene Change	Cn pp	(pp = program no. 00- 63)
User 1 Switch	Cn 64	
User 2 Switch	Cn 65	

NOTE: A fade time command with a value of 00 will be sent following a program change whenever there is a fast switch press for Go, User 1, or User 2.

Memory Dump F0 08 4C 02 7F dd..... F7

First 5 bytes are dump header, dd = memory contents starting with scene 1 sent in nibblized form (high nibble first). There are 16,280 (decimal) data bytes sent following the header.

RECEIVED ONLY DATA:

Note On	9n xx vv	(xx = note number 20-7F)
Note Off	8n xx vv	(vv = velocity 00-7F)

(Note numbers are programmable for each light channel).

MIDI Clock	F8	(to control chase speed)
Start	FA	
Stop	FC	

11 - SPECIAL FUNCTIONS

There are fifteen special functions that are accessed by using the Menu Select switch, the Data Entry slider and the LCD. These functions address tasks that are used less frequently when programming a scene or when configuring certain parameters inside the PLC 3200. In order to access a particular function you must hold down the Menu Select switch while moving the Data Entry slider up and down to scroll through the functions. They will be displayed in the LCD as you move the slider. Once you reach the function that you want to address, release the Menu Select switch. From there you will use the data entry slider or certain switches to set parameters depending on the function selected. Once a function is set, exit special function mode by pressing the Menu Select switch once again. Generally after a function is programmed it will be stored in preset memory until you decide to change it later.

The functions in order from lowest to highest are:

- Step Edit Chase
- Select Chase Source
- Select Number of Chase Cycles
- Select MIDI Channel
- Assign MIDI Notes to Channels
- Send MIDI Memory Dump
- Select Footswitch 1
- Select Footswitch 2
- Blind Mode On/Off
- Select Pre-heat Level
- Special Effects On/Off
- Special Effects Arm
- View Sub Master Assignments
- Clear All Memory
- Soft Patching of Dimmers

STEP EDIT CHASE

This function gives you a powerful tool for writing and editing chase sequences. When selected, step chase lets you manually step through your chase patterns with the left and right arrow keys. The step number as well as the contents of the step will be displayed in the bottom line of the LCD. If chase record is turned on, you can change, delete, and insert individual steps.

When you select step chase from the special functions menu the chase will pause. The arrow keys can now be used to manually step through the chase. To change a step, use the arrow

keys to first find the step, then enter a new value the same as you would when writing a new chase from scratch. Make sure chase is in record mode (press and hold the Chase switch until the Chase LED starts flashing). You can even write a new chase from scratch using step chase. You can also add new steps to the end of the chase making it longer by using the right arrow to reach the end step, then entering a chase element there.

To remove a step, first go to it with an arrow key then press and hold Delete for one second. Chase record must be on. The step will be erased and any following steps will be moved down one to fill the empty space.

To insert a step, use the arrow keys to find the step where you want the new element inserted. Press Insert, "_____" will appear in the LCD where the name of the element will go. Select the new element you want to insert. This can be any chase element; channel flash, sub flash, or scene. The name of that element will replace the underline and all of the following chase steps will be moved up one step to make room. If the chase was full when you made the insert, the last step will be lost. You can abort the insert process by pressing Insert a second time.

CHASE SOURCE

There are three selections for chase source, internal, MIDI, and audio. Use the data entry slider to select between the three. You will only affect the chase source for the scene you have currently selected in "Now". This means that each chase must be assigned its own chase source. If you don't set it, it will always start out as internal. Once you select the source you must store the scene to memory to make it permanent. All you need to do is press Store and hold it down for one second, the updated chase will be re-written to memory.

Internal is the default chase source. This means that the chase speed is clocked internally and controlled by either the Chase Speed slider or the Chase Tap switch. The current speed in flashes per minute is displayed next to "INTERNAL" in the LCD.

MIDI source requires you to supply MIDI clocks at the MIDI in jack. A MIDI drum machine or MIDI sequencer will usually transmit MIDI clocks. By moving the Chase Speed slider you can select between having the chase run at whole, half, quarter, eighth, or sixteenth note intervals in time to the MIDI clock information. Don't forget to store the scene once you select MIDI as the chase source.

Audio source lets you sync the chase to an external audio signal at the audio in jack. The audio signal must be of suitable level and type to trigger a chase. The sound must be a pulsing type sound in order to provide "triggers" for the chase to lock on to. Percussive sounds work the best. Adjust the level of the audio coming in along with the level of the Audio Sync slider to achieve the best results. The signal must be a line level signal in order to be strong enough to trigger the chase.

CHASE CYCLES

This function is used when linking scenes together. By setting the number of chase cycles for a chase scene, you can link another scene to it. Whenever the chase is called it will cycle through the pattern however many times you choose then jump to whatever program you

have linked. If there is no link, the chase will run continuously no matter what. Just like when programming the chase source, you must save the scene with the new selection in order to make it part of the scene. The choices for chase cycles are 1-99 or continuous.

MIDI CHANNEL

This allows you to select the MIDI channel (1-16) that the PLC 3200 will send and receive MIDI data on. If you have other MIDI instruments being driven by a computer or sequencer, it's a good idea to give the lights their own channel to avoid interference between devices.

MIDI NOTE ASSIGNMENT

The PLC 3200's thirty two channels can respond to MIDI note on and MIDI note off commands. The note's velocity value will determine the brightness of the light. The note that an individual channel responds to is programmable. When you select this function, a channel number will appear in the top line of the LCD and its corresponding MIDI note will appear in the bottom line. Use any channel flash switch to select one of the 32 light channels then use the data entry slider to select the note you want assigned to that channel. The notes are displayed as letter values followed by an octave number. Middle C is displayed as C 03 which is standard for most MIDI devices. You can assign as many channels to the same note as you want. If you don't want a channel to respond to notes, select a note at the very top or bottom of the scale, out of the range of any notes that it might receive.

MEMORY DUMP

When this function is selected, the message "HIT GO TO START MIDI DUMP" will appear in the LCD. This will allow you to transfer the contents of the PLC 3200's preset memory which contains the scenes, songs, and various parameters, to another PLC 3200 or to a MIDI recorder. The recording device could be either a computer, a MIDI sequencer or a MIDI data recorder. Consult your MIDI recorder's instructions regarding recording MIDI system exclusive messages.

After pressing Go, "PLEASE WAIT, DUMPING MEMORY" will appear in the LCD for a few seconds until the transfer is complete. The data is not lost from memory, only a copy is encoded and sent out the MIDI jack.

FOOTSWITCH 1

The footswitches with the PLC 3200 can be programmed to duplicate the functions of many of the front panel switches. From the factory, footswitch 1 is set to "Go" and footswitch 2 is set to "Black". With the data slider you can also select from any of the flash switches, Chase Tap, Audio Sync, User 1, and User 2. Assigning one of the footswitches to Chase Tap can be very useful. With two programmable footswitches you have the option of using both hands and both feet to operate your lights.

FOOTSWITCH 2

This is the same as for footswitch 1.

BLIND MODE

Blind mode is a seldom used mode of manually operating a console without the aid of scene memory. In blind mode you set up each scene with the channel faders and then call the scene by pressing the Go switch. The scene will fade in at the rate determined by the Fade Time slider. When you move the channel faders no lamps will be affected until you press Go. This allows you to create scenes "on the fly" during a performance. Make sure that the Scenes 1-32 switch is off while setting up the next scene.

Use the data entry slider from the Blind Mode menu selection to turn blind mode on and off. This setting is not stored in preset memory so you have to turn it on each time you power up the console whenever you wish to use it.

PRE-HEAT

Setting a pre-heat level can improve the response speed of your lamps especially when you are using inexpensive or older style dimmers. Pre-heat maintains a small amount of current to the lamps when the controlling channels are off which helps to overcome a certain amount of inertia when they need to be flashed or brought up. To adjust the pre-heat for your system, turn all or some of the lamps off. Next raise the pre-heat level until the lamps just start to turn on, then back the level off one step.

SPECIAL EFFECTS

This allows you to configure channels 29 through 32 as special effects channels or as normal channels (the same as 1 through 28). When configured for special effects, channels 29 through 32 can be used to control on/off type effects like fog machines or flash pots. To connect to these types of devices requires special equipment. You will probably need to use the SUNN DEPLEX 216 which converts the SUNNPLEX signal to individual 0-10 volt signals. From there you can connect to relays or to special effects equipment that can accept a 0-10 volt signal. SUNN also offers the ND 600 for controlling non-dimmer type devices.

Use the data slider to select between the two configurations. When configured for special effects, these four channels are disconnected from the rest of the system so that they won't be accidentally triggered from chase flashes or from fades into scenes which would normally turn those channels on. The channels will also be disconnected from their respective faders. The only time that the special effects can be fired is when they are armed (as explained in the next paragraph), and the special effects switches are pressed or turned on from MIDI. The special effects switches will act as toggle on/off switches. Press once to turn them on, press again to turn them off. The channels will output zero when off and full intensity when on.

NOTE: This configuration is stored in preset memory so that when you power up the next time, they will still be configured for special effects.

SPECIAL EFFECTS ARM

Before you can use the special effects switches they must first be configured as explained in the previous section, then they must be armed. Use the data entry slider to select between armed and disarmed. As a safety precaution you must re-arm them each time you turn the PLC 3200 on. The LEDs above the four switches will flash when they are armed. Whenever one is pressed turning the channel on, the LED will stay lit without flashing. When turned off, the LED will resume flashing.

SUB MASTER ASSIGNMENTS

This selection allows you to see which scenes are assigned to sub masters A, B, C and D. Consult the chapter on sub masters regarding how to assign scenes to them.

CLEAR ALL MEMORY

From here you can reset the entire memory of the PLC 3200 to its factory settings. **All scenes will be erased** with channels set to off, **all songs will be erased** and all system parameters reset to their default values. To initiate this function press and hold down the Delete switch and the 0 switch which is on the keypad for two seconds. The massage "Please wait, initializing" will appear in the LCD while the memory is being rewritten. When the message "Press Delete & 0 to clear memory" returns the process is finished.

SOFT PATCHING OF DIMMERS

This function gives you the ability to softpatch dimmers to channels. When selected the display will read "DIMMER: XXX" on the top line and "CHANNEL: XX" on the bottom (X will be a number). To assign channels to dimmers, first use the data slider to select the dimmer number (1-128), then press the flash switch (1-32) for the channel you want to assign to the selected dimmer. You must always select the dimmer first then assign a controlling channel.

One hundred and twenty eight dimmers are addressable through the DMX512 connector. Only thirty two dimmers are addressable through the SUNNPLEX and the AMX192 connectors. If you want to address more than 32 dimmers you must use the DMX512 port.

From the factory, dimmers 1-32 are assigned to channels 1-32 with dimmers 33-128 assigned to channel 1. If you are using the DMX 512 connector with more than 32 dimmers you must assign each dimmer you intend to use to a channel. Since the PLC 3200 has only 32 controlling channels obviously some channels will be controlling more than one dimmer. The assignments are stored in preset memory so they won't be lost.

12 - TROUBLESHOOTING

PROBLEM: Buzz in the audio system.

Lighting control and audio signals have always been enemies. That annoying little buzz is caused by switching transients, which are high current spikes of power originating in the triacs that control the intensity of the lights. These transients are the source of a couple of different kinds of interference. One of these is radio frequency interference (RFI), which radiates from unfiltered control systems and is picked up by the audio system. SUNN dimmer packs control this problem with high frequency filters that suppress the RFI.

If a buzz is present, make sure you have followed the rules listed in Chapter 2. In addition, always follow good audio practices:

- Use balanced (3 pin) mic cords.
- Use high quality instrument cords.
- Use three wire (grounded) power cords on instrument amplifiers.
- Repair faulty jacks on guitars and equipment.

This should eliminate any buzz caused by the lighting system. However, if you still have problems, try plugging the dimmer packs into another AC outlet.

PROBLEM: High pitched whine in the audio system.

If a whine is present, and you are sending controller signals through a snake, then either the snake has some unbalanced channels or it has excessive crosstalk. If either is the case forget the snake and use a separate mic cord for your SUNNPLEX signal. (NOTE: a whine on unterminated or unused channels may be normal).

PROBLEM: The lighting system does not operate properly.

Whenever you troubleshoot any system, first verify that it is correctly interconnected and that it is plugged into a working AC outlet. Next, isolate the problem to one part of the system by verifying the proper operation of the other parts.

DIMMER PACKS

All SUNN dimmer packs have a self-test feature built into them; with lights plugged into the dimmer pack, and the dimmer pack plugged into an AC socket, the lights will come on at full intensity when no mic cord is attached to the dimmer pack. If any lights do not come on, and the lights are known to be good, the problem may be caused by one or more blown fuses inside the dimmer pack. These should only be replaced by qualified service personnel.

WARNING: Busses, triacs, heatsinks and parts of the circuit board are at 120 VAC potential. Do not open the case without first disconnecting the AC cord. Install only fuses of the same rating indicated on the circuit board.

If there is still a problem in the dimmer pack, refer it to a qualified service technician.

LIGHTS

If you suspect a burned-out light try plugging it into a working channel. If it still doesn't come on replace it. SUNN Lights may also be tested by plugging them directly into any 3- prong AC outlet (be careful, the lights get hot and they are bright). Replace any burned out lights.

MIC CORD

The quickest way to determine if you have a faulty mic cord is to swap it with one that is known to be good. If the problem disappears your cord is probably bad. Cords can be tested easily with an ohmmeter. Measure the resistance between pin 1 on the male end and pin 1 on the female end. The reading should be close to 0 ohms. Now repeat the test for pins 2 and for pins 3. If these readings are correct, measure between pin 1 and 2, between pin 1 and 3, and between pin 2 and 3 on one of the connectors. The meter should show an open circuit. If the cord is bad repair or replace it.

CONTROLLER

When the PLC 3200 is first turned on the numbers in the "Next" display should read "01" and the numbers in the "Now" display should read "00". A message will also appear in the LCD giving the revision of software currently in the machine. If the console is dark, check the AC cord and AC source as well as the fuse. If it's the fuse, replace it with a 250 MA (1/4 Amp) fuse. If the controller seems to be working but doesn't affect the lights, re-check the mic cord or DMX cable. If you are interfacing to a large system capable of many dimmer channels make sure that the dimmers are set up to be addressed by channels 1 through 32 when using the Sunnplex or AMX 192 connectors. There are no user-serviceable parts in the PLC 3200, therefore any internal problem should be referred to a qualified service technician.