LEPRECON®

PRO LIGHTING EQUIPMENT

LWD-2400 User's Manual

Filename: 21-2185.doc (LWD2400 User Manual.doc)

Revision History:

Rev:	1.1
Date:	22 February 2000 gaw
Description:	Original input taken from various sources, including LCD_User_Interface.doc

Rev:	1.2
Date:	1 March 2000 gaw
Description:	Enhancements, completing first pass.

Date:	2 OCT 2000
Document Number:	21-2185
Document Revision:	C
Software Version:	1.5
Author:	Glenn Witalec
Description:	Simplified BASIC OPERATION section. Added TRIGGER feature description in ADVANCED FEATURES. Added TRIGGER feature menus in MENU REFERENCE section. Added header, footer and page numbers. In software, completed the basic TRIGGER feature (time-of-day and dmx level for channels and scenes).

Date:	7 FEB 2001
Document Number:	21-2185
Document Revision:	D
Software Version:	1.6
Author:	Glenn Witalec
Description:	Clarified configuration switch figure.

Date:	17 April 2001
Document Number:	21-2185
Document Revision:	E
Software Version:	1.6
Author:	Don Stauffer
Description:	Correction to specifications

Date:	25 Nov 2002
Document Number:	21-2185
Document Revision:	F
Software Version:	1.8v
Author:	Don Stauffer
Description:	Correction to software specification

Date:	03 April 2003
Document Number:	21-2185
Document Revision:	G
Software Version:	2.0
Author:	CB
Description:	Correction to Page 7, Internal Switch Settings

TABLE OF CONTENTS

Features and Specifications

GENERAL: Wall mounted.
                    Passively cooled.
                    Simple system with two easy to service boards: one controller board and 6 dual-channel power modules.
                    Easily accessible line and load terminal strips.
                    Nonvolatile storage of program information. System clear feature.
                    Simple, intuitive programming using 5 front panel switches and the 2 line x 16 character LCD display.
                    Seamless control of all 48 channels from any LWD-2400 front panel.

APPROVALS: UL Listed

AMBIENT: -20 to 40 degrees C.

HUMIDITY: 0 to 95% relative, non-condensing.

POWER: 2400 watts per channel
                    28,800 watts per LWD-2400 (12 x 2400).

CHANNELS: Field-replaceable power module. Two channels per module.
                    12 channels per LWD-2400.
                    48 channels in a fully configured system.

EXPANSION.   Up to 4 LWD-2400's easily daisy chained for a total of 48 channels.

DMX ADDRESS: Individual base address switch on each 12 channel dimmer pack.

DIMMING METHOD: Software timed from filtered, phase shifted zero crossing. Automatically supports 1, 2 or 3-phase systems.

CUE STACK: 100 programmable scenes with FADE IN, FADE OUT, DELAY and LINK. Time-of-day trigger.

SECURITY: None at this time.

TIME KEEPING: Settable. Seconds, minutes, hours, days, years.

DMX: Input and pass thru connectors.
                    Merging of DMX input and locally generated channel levels.
                    Can program SCENES via DMX input (DMX "snapshot").

TRIGGERS: 100 independent triggers.
                    Trigger sources: Time-of-Day, DMX input level.
                    Trigger can affect: dimmer channels, Cue Stack operation.
                    Trigger actions: On, Off, Toggle

Basic Operation

Installation

It is assumed for the purposes of this manual that the LWD-2400 has already been mounted, and the Line and Load connections have been properly established. If this is not the case, refer to document number 21-2186 for installation instructions.

What it Looks Like

The figure below shows a typical LWD-2400 dimmer. Note the 12 breakers, one per output channel, with channel 1 at the top and channel 12 at the bottom. The user interface section consists of five buttons and a 2 line x 16 character LCD display located toward the bottom of the unit. DMX input and pass thru connectors are located on the bottom panel. Line and Load connections are established through the rectangular access plate on the top panel. The front of the unit is hinged and swings open to reveal the inside of the unit.

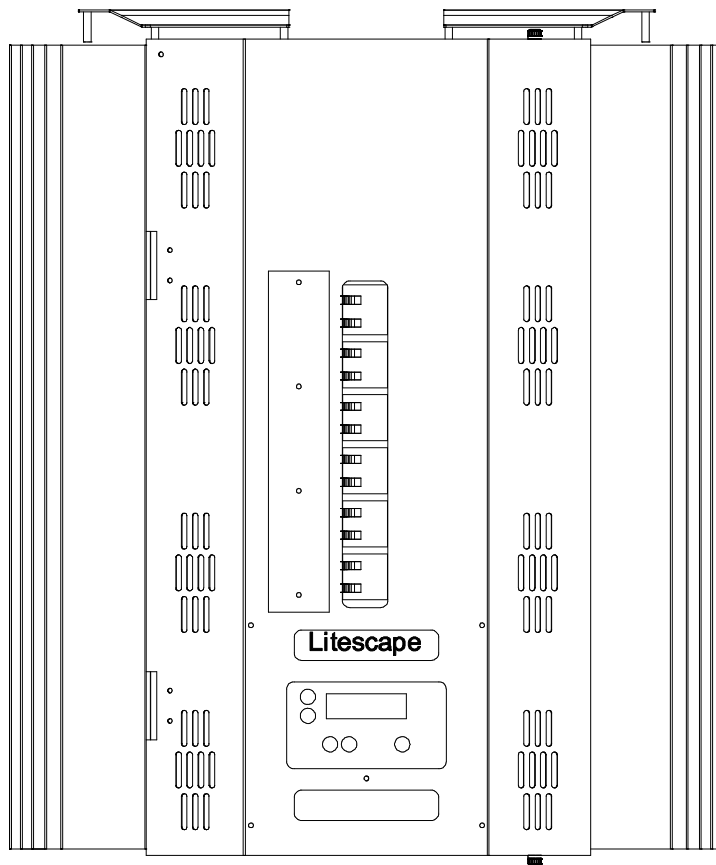**Figure 1 LWD 2400 Mechanical Drawing**

CAUTION: DANGEROUS HIGH VOLTAGES EXIST INSIDE THE LWD-2400 WHEN ENERGIZED. ALWAYS REMOVE POWER FROM THE UNIT BEFORE OPENING THE FRONT PANEL BY TURNING OFF THE BREAKERS SUPPLYING THE INPUT POWER. THEY WILL BE LOCATED ON AN ELECTRICAL SUB PANEL THAT SUPPLIES POWER TO THE LWD-2400, AND SHOULD NOT BE CONFUSED WITH THE 12 BREAKERS LOCATED ON THE UNIT ITSELF.

Internal Switch Settings

Open the front panel on the LWD-2400 and locate the main controller board on the back of the panel. Further locate the DIP switch on the controller board. The 8-position switch controls the parameters shown in the figure:

SWITCH to LEFT   **8**   SWITCH to RIGHT

SWITCH to LEFT		SWITCH to RIGHT
Normal		Clear All
Disable Multiple WALL DIMMERS		Enable Multiple WALL DIMMERS
Disable WALL PANELS		Enable WALL PANELS
Only "Real" Channels Programmable		All Channels Programmable
"Old" Phase arrangement		"New" Phase arrangement
Normal Dimmer mode (responds to polls)		"Mute" dimmer mode (does not respond to polls, but fires channels)

DIMMER LOGICAL NUMBER   msb
                         lsb

1

msb lsb
R   R - Dimmer #4
R   L - Dimmer #3
L   R - Dimmer #2
L   L - Dimmer #1

For Dimmer number:	1	2	3	4
Set Switches To:				
Logical Channel number:	1-12	13-24	25-36	37-48

NOTE: Do not confuse the Logical Channel number with the DMX base address. The DMX base address for each Dimmer can be set independently using the DIMMER submenu.

Single Dimmer systems use this setting

Figure 2 Controller Board Configuration Switch Settings

Powering It Up For the First Time

Make sure that all 12 channel output breakers are in the off position.

There is no direct on/off switch on the LWD-2400. Input power to the unit is controlled by the 1 to 3 power input breakers located on a separate electrical sub panel. The phase configuration of the LWD-2400 determines how many breakers there will be. If not already on, turn ON the power input breakers.

After applying power, the LCD should illuminate and go through a quick process of "downloading scenes". After that, the display should be alternating between these three screens:

UP		UP		UP	
	LITESCAPE (TM) 7:26:48 PM		LITESCAPE (TM) THU SEP 14 2000		LITESCAPE (TM) VERSION 1.4
DOWN	PREV NEXT ENTER	DOWN	PREV NEXT ENTER	DOWN	PREV NEXT ENTER

Figure 3 Power Up Menu Sequencing

Note: Before proceeding, you may want to refer to a later section entitled "How to Use the Interface" for information on button and LCD screen characteristics.

Clearing the Dimmer

It's a good practice to initialize all variables in the LWD-2400 when it is first put into use.

To do this, get to the MAIN MENU then press the NEXT button until the "system" selection is blinking and press ENTER. Now press the NEXT button several times, go through the CLEAR ALL screen until the MEMORY STATUS sub menu appears. If the "Locked" parameter is flashing, press DOWN so that it changes to "Open", then press ENTER.
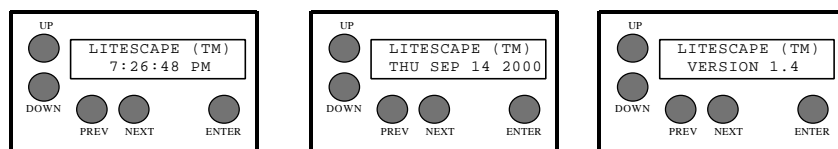
```
MAIN MENU        NEXT  NEXT  NEXT   MAIN MENU       ENTER   EDIT TIME:       NEXT  NEXT  NEXT   CLEAR ALL?      >  PREV   MEMORY STATUS:
dimmers scenes  ──────────────────  status  system  ─────   Thu Sep 14 2000  ──────────────────  (ENT = Yes)    ◄───        Locked
                                                                                                                    NEXT
                                                                                             ENTER │                 DOWN │
                                                                                                   ▼                      ▼
                                                                              CLEAR ALL?      >        MEMORY STATUS:
                                                                              (ENT again)                  Open
                                                                                   ENTER │
                                                                                         ▼
                                                                              CLEAR ALL?      >
                                                                              (..DONE.. )
```
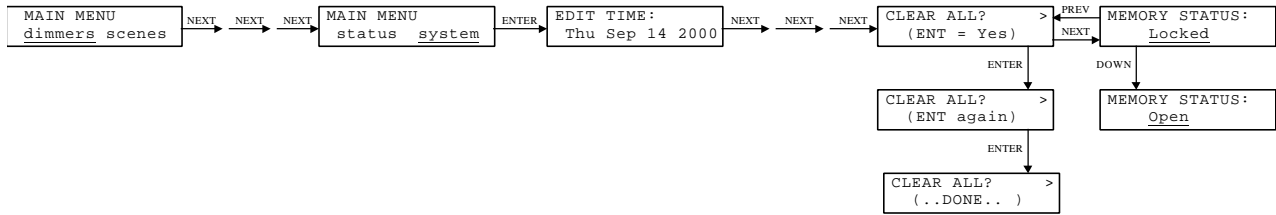
Figure 4 Clearing all Dimmer Variables

Now press PREVious to get back to the CLEAR ALL screen and press ENTER twice. The screen should respond with "(…DONE…)", indicating that all system variable and programmable features have been set to their initialized state.

If you are unable to access the 'clear all' menu, the same function can be done with a hardware reset. Set the 'clear all' switch (top switch shown on previous page) to the right. Apply power to the dimmer, then remove power after 30 about seconds. Set the switch back to the 'normal' operating position.

Setting the DMX Base Address

After clearing the entire dimmer in the previoius step, the DIMMER ADDRESS should have been initialized to DMX address 1. To verify this, use the NEXT and PREVious buttons to get to the MAIN MENU "dimmer" screen and press ENTER. The "dimmer1" field should be flashing. Press ENTER again. The current DIMMER ADDRESS value of "1" should be blank flashing.

```
                                          DIMMER ADDRESS   ENTER   DIMMER ADDRESS
                                          dimmer1   3   >  ─────   dimmer1   3   >
                                                │ UP
                                          DIMMER ADDRESS
                                          dimmer1   2   >
                                                │ UP
MAIN MENU        ENTER   SELECT DIMMER:   ENTER   DIMMER ADDRESS
dimmers scenes  ─────    dimmer1 dimmer2  ─────   dimmer1   1   >
```
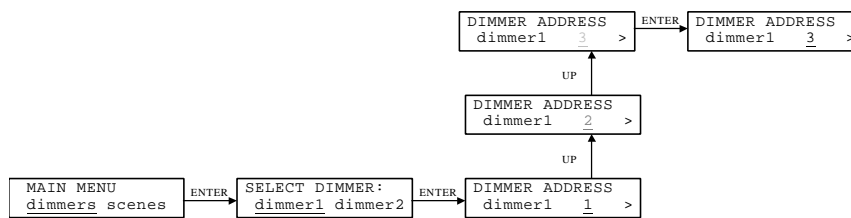
Figure 5 Setting the DMX Base Address

To change the DMX start address for dimmer1 from "1" to "3", press the UP key twice to change the displayed base address to "3". The "3" should now be inverse flashing, indicating that the new address has not yet been entered. Press ENTER to accept the change. The "3" should now change to blank flashing, and the dimmer should now be responding to DMX addresses 3-14.

Use the menu keys to return dimmer1's DMX start address to "1" before continuing.

Testing an Output Channel

To activate the channel test feature, navigate to the CHANNEL CURVE sub menu for channel 1 using the NEXT and PREVious buttons. Now press UP twice to put channel 1 into the "force-to-on" state. The "on" field should be inverse blinking, indicating that the change has not yet been accepted.

```
                                    ┌─────────────────────┐ ┌─────────────────────┐
                                    │ CHAN:   1    2    3  │ │ CHAN:   1    2    3  │
                                    │ CURVE:on   st   st  │─│ CURVE:on   st   st  │
                                    └─────────────────────┘ENTER└────────────────┘
                                              │ UP
                                    ┌─────────────────────┐
                                    │ CHAN:   1    2    3  │
                                    │ CURVE:nd   st   st  │
                                    └─────────────────────┘
                                              │ UP
┌──────────────┐      ┌──────────────────┐      ┌──────────────────┐      ┌─────────────────────┐
│ MAIN MENU    │ENTER │ SELECT DIMMER:   │ENTER │ DIMMER ADDRESS   │NEXT  │ CHAN:   1    2    3  │
│ dimmers scenes│────▶│ dimmer1 dimmer2  │────▶│ dimmer1    1   > │────▶ │ CURVE:st   st   st  │
└──────────────┘      └──────────────────┘      └──────────────────┘      └─────────────────────┘
```
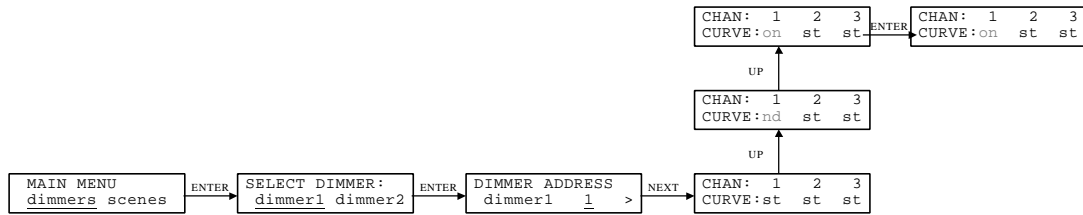
Figure 6 Testing an Output Channel

Press ENTER to put channel 1 in the "on" state. If the system is properly wired, the lamp load connected to LWD-2400 physical channel 1 should be full-on.

Before proceeding, be sure to put channel 1 back into "st", or standard curve mode.

Attaching and Using DMX

DMX data is not required for the dimmer to operate properly. However, if DMX-related control is desired, each dimmer must receive the DMX data stream directly. DMX data is **not** transferred over the BRDTalk© network.

On the bottom of the unit there are two DMX jacks, labeled "IN" and "THRU". Insert the LWD-2400 into the DMX stream by connecting to one or both of the jacks. Then, at the source console, verify that movement of faders 1 through 12 corresponds to light output on LWD channels 1 through 12. If DMX control is unsuccessful, the following may aid in locating the problem:

- check console for 1 to 1 patching

- try a different cable ==or==

- attach the console to another, known good dimmer and verify operation

- check LWD-2400 "dimmer1" DMX base address, should be set to "1" (see "Setting the DMX Base Address" above)

- do a full-on test of the output channel (see "Testing an Output Channel" above).

Adding More Dimmers

Adding More non-Networked Dimmers

To add any number of dimmers that will **not** be connected via BRDTalk ©, always set the Dimmer Number switch to "1" (see Figure 2), then follow the configuration steps above. The DMX Base Address can be set individually as desired for overlapping or non-overlapping DMX channels.

Adding Networked Dimmers

To add any number of dimmers that **will** be connected via BRDTalk ©, always set the Dimmer Number switch to a unique setting between "1" and "4" (see Figure 2), then follow the configuration steps above. The DMX Base Address of each unit can be set individually as desired for overlapping or non-overlapping DMX channels.

The standard LWD-2400 is 12 channels wide. It can be expanded to 24, 36 or 48 channels using the proprietary BRDTalk© networking option. All units are shipped with networking capability, both hardware and software.

A few simple steps should be followed in order to use the networking feature:

- Maximum of 4 LWD-2400s, each with a unique bank switch setting, 1 through 4.

- Connect each unit using standard 4 wire modular cabling (phone wire with RJ11 connectors). Order of attachment is not important. Maximum cable length is approximately 500 feet.

- Each unit requiring DMX data must be inserted into the DMX chain. DMX is **not** broadcast over BRDTalk©

- Each LWD-2400 can be used to access the programmable features. Simply begin pushing user interface buttons on the front panel and that unit will automatically be recognized and granted control. At this time there is no individual panel lockout feature.

Advanced Features

Cue Stack Operations

The LWD-2400 contains a programmable 100 step cue stack. They are named step 1, step 2, … step 100. Various parameters are programmable for each step, including fade time, delay time, next-step link, and channel output level for all 48 channels. In addition, the cue stack can be triggered by time of day or level on a specified DMX input channel.

The following tutorial shows how to initialize the stack, record a three step cue stack, run the stack, stop and edit a step, snapshot from DMX and then restart the stack.

Clearing the Cue Stack

In the MAIN MENU, navigate to the "system" sub-menu choice and press ENTER. Press NEXT until the CLEAR SCENES sub-menu appear, then press ENTER ENTER. All stack steps should be initialized the default values.
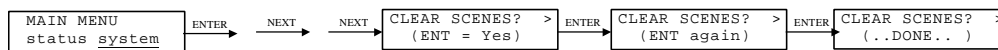

Figure 7 Clearing the Cue Stack

Programming a Three Step Cue Stack

In the MAIN MENU, navigate to the "scenes" sub-menu choice and press ENTER. SCENE STATUS should be "off", now is "1" and nxt is "2". Press NEXT until the FADE time field is displayed. Modify the FADE time field for SCENE 1 to "0:02" by pressing DOWN three times. The field "0:02" should be reverse blinking; press ENTER to accept the change and the field changes to an underline blink.
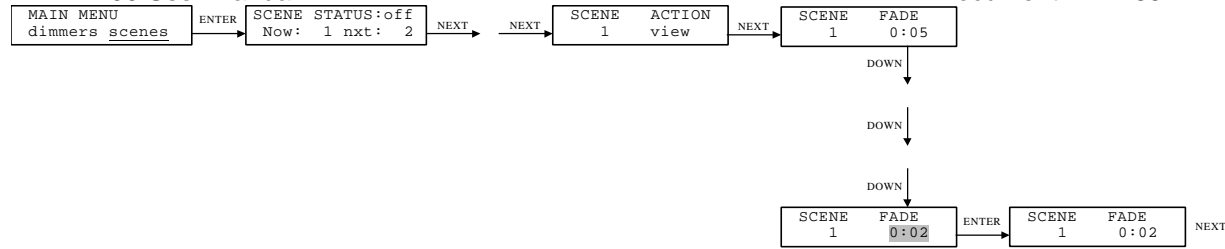
```
┌──────────────┐        ┌──────────────────┐        ┌──────────────────┐        ┌──────────────────┐
│ MAIN MENU    │ ENTER  │ SCENE STATUS:off │ NEXT   │ SCENE    ACTION  │ NEXT   │ SCENE    FADE    │
│ dimmers scenes│──────→│ Now:  1 nxt:  2  │──NEXT─→│   1      view    │──────→ │   1      0:05    │
└──────────────┘        └──────────────────┘        └──────────────────┘        └──────────────────┘
                                                                                        │ DOWN
                                                                                        ↓
                                                                                      DOWN
                                                                                        │
                                                                                        ↓
                                                                                      DOWN
                                                                                        │
                                                                                        ↓
                                                        ┌──────────────────┐        ┌──────────────────┐
                                                        │ SCENE    FADE    │ ENTER  │ SCENE    FADE    │ NEXT
                                                        │   1      0:02    │──────→ │   1      0:02    │
                                                        └──────────────────┘        └──────────────────┘
```

Figure 8 Programming Cue Action and Fade Time

Press NEXT and modify the DELAY time field from "INF." to "0:05" seconds by pressing UP 6 times. Press ENTER to accept the change. Proceed through the LINK select menu without modification and get to the CHANNEL LEVEL sub menu. Press UP as required to change the level of channel 1 to 100%. It is not necessary to press ENTER to cause the change to be accepted. Also note that since the SCENE ACTION field was set to EDIT, the device connected to channel 1 should be following the level on the lcd (a "live" edit). If the ACTION had been set to "view", then a "blind" edit would be performed, that is, the connected device would **not** show the LEVel in real time.

```
                                                                         ┌──────────────────┐
                                                                         │ CHAN:  1   2   3 │
                                                                         │ LEV:100   0   0  │
                                                                         └──────────────────┘
                                                                                 ↑ UP (many times)
        ┌──────────────────┐        ┌──────────────────┐        ┌──────────────────┐    ┌──────────────────┐
        │ SCENE   DELAY    │ ENTER  │ SCENE   DELAY    │ NEXT   │ SCENE   LINK     │NEXT│ CHAN:  1   2   3 │
        │   1     0:05     │──────→ │   1     0:05     │──────→ │   1      2       │───→│ LEV:   0   0   0 │
        └──────────────────┘        └──────────────────┘        └──────────────────┘    └──────────────────┘
                 ↑ UP (6 times)
        ┌──────────────────┐
NEXT    │ SCENE   DELAY    │
─────→  │   1     INF.     │
        └──────────────────┘
```
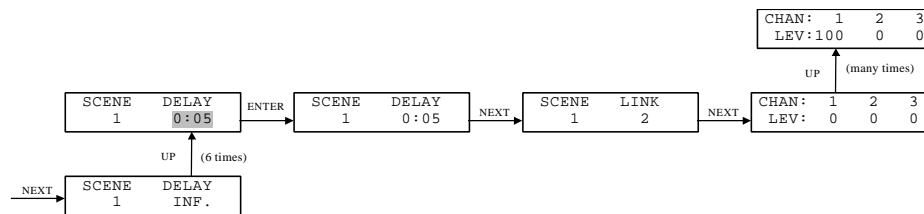
Figure 9 Programming Cue Delay Time, Link and Channel Levels

Using the NEXT and UP keys as required, modify the level of channel 2 to 100%.

Now go back to the SCENE select sub menu and choose SCENE "2". Repeat the CHANNEL LEVEL modification steps on cue step #2, but this time modify channels 3 and 4, to 100% instead of channels 1 & 2.

Repeat for cue step #3, but select and modify channels 5 & 6 to 100%.

Making the Cue Stack Circular

The cue stack will initialize with all steps pointing to the next sequential step. When executed, the cue stack will continue sequentially through the steps until it runs across any step with either the FADE or DELAY time fields set to INFinite. It can be made circular, or repeating, by making the LINK of one of the steps to point to any previous step. In this case, let's make the cue stack repeat steps 1 through 3 indefinitely. Navigate to the LINK field for step 3 and change it from "4" to "1" by pressing DOWN three times, then pressing ENTER.
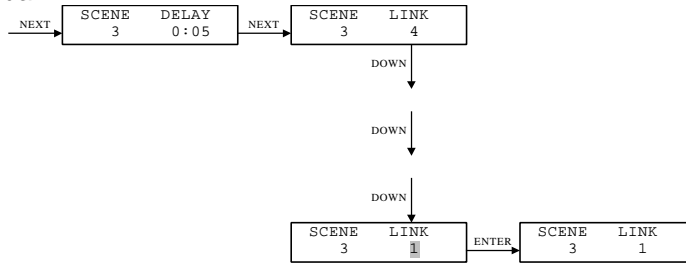
```
         ┌──────────────┐         ┌──────────────┐
  NEXT   │ SCENE  DELAY │  NEXT   │ SCENE  LINK  │
 ─────►  │   3    0:05  │ ─────►  │   3      4   │
         └──────────────┘         └──────────────┘
                                         │ DOWN
                                         │
                                         │ DOWN
                                         ▼
                                         │ DOWN
                                         ▼
         ┌──────────────┐         ┌──────────────┐
         │ SCENE  LINK  │  ENTER  │ SCENE  LINK  │
         │   3      1   │ ─────►  │   3      1   │
         └──────────────┘         └──────────────┘
```

Figure 10 Modifying the Link

Running the Cue Stack

Execute the cue stack by changing the SCENE STATUS field to "on" and pressing ENTER.

```
      ┌─────────────────────┐  ENTER  ┌─────────────────────┐
      │ SCENE STATUS:on     │ ─────►  │ SCENE STATUS:on     │
      │  Now:  1 nxt:  2    │         │  Now:  1 nxt:  2    │
      └─────────────────────┘         └─────────────────────┘
                 ▲ UP
      ┌─────────────────────┐
      │ SCENE STATUS:off    │
      │  Now:  1 nxt:  2    │
      └─────────────────────┘
```
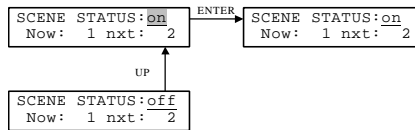
Figure 11 Running the Cue Stack

The programmed cue stack should be repeated every 15 seconds. Channels 1 & 2 should FADE on for two seconds, then stay on for an additional three seconds (total on time of 5 seconds). This should be followed by 5 seconds for step 2 and 5 seconds for step 3.

Stopping the Cue Stack

Turn the cue stack "off" by changing the SCENE STATUS to "off" and pressing ENTER.

```
      ┌─────────────────────┐  ENTER  ┌─────────────────────┐
      │ SCENE STATUS:off    │ ─────►  │ SCENE STATUS:off    │
      │  Now:  1 nxt:  2    │         │  Now:  1 nxt:  2    │
      └─────────────────────┘         └─────────────────────┘
                 ▲ UP
      ┌─────────────────────┐
      │ SCENE STATUS:on     │
      │  Now:  1 nxt:  2    │
      └─────────────────────┘
```
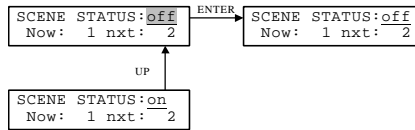
Figure 12 Stopping the Cue Stack

DMX "Snapshot" Onto a Cue Step

It is possible to record directly from a console into a cue step. With the console attached and operating, proceed to the SCENE ACTION sub menu and change the field to "*snapshot*". Press NEXT four times so that the CHANNEL LEVEL sub is displayed. Changes in level at the console should be reflected on the lcd display. When the desired look is set, press ENTER to record the current DMX levels into the cue step. Repeat for other SCENES as deisred.
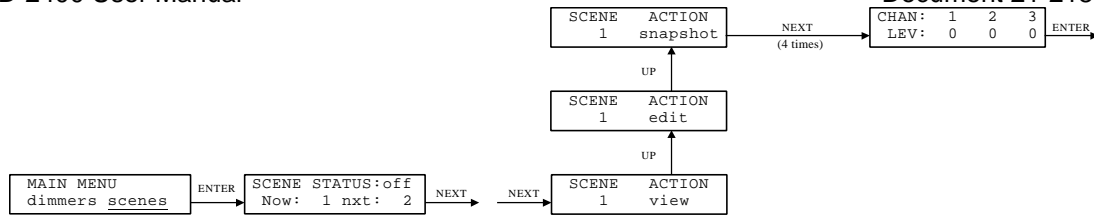
```
                                    SCENE    ACTION                 CHAN:  1   2   3
                                      1    snapshot    NEXT         LEV:   0   0   0   ENTER
                                                      (4 times)
                                          UP
                                    SCENE    ACTION
                                      1      edit
                                          UP
   MAIN MENU            SCENE STATUS:off          SCENE    ACTION
 dimmers scenes  ENTER  Now:  1 nxt:  2   NEXT   NEXT   1     view
```

Figure 13 DMX Snapshot onto a Cue Step

Trigger Operations

The LWD-2400 contains 100 completely independent programmable triggers, numbered 1 through 100. Extreme triggering flexibility enables any dimmer channel or cue stack step to be turned on or off based on DMX input level or Time of Day. Multiple triggers can be assigned to the same Output Channel, for instance, one to turn it on and another to turn it off. In the future, more Outputs, Sources and Actions will be added as they become available, but for now, here are the currently supported functions:

Trigger Numbers	Outputs Affected	Possible Sources	Action Taken
1 through 100	none (trigger disabled)	Time-of-Day	on
	dimmer channel	DMX channel level	off
	cue stack (scene)		toggle

The following tutorial shows how to clear all triggers, how to program both a channel and the cue stack to turn-on based on time of day, and how to get the same channel to turn off based on a input DMX level. The triggers to be programmed are:

Trigger Number	Type of trigger	Stimulus	Action Taken
1	channel	Time-of-day	turn off
2	channel	DMX level	turn on
3	scene	Time-of-day	turn on

Clearing All Triggers
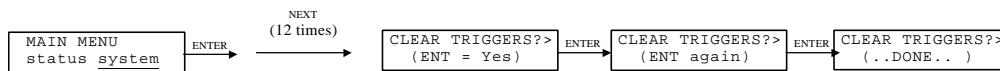
```
                           NEXT
                         (12 times)
   MAIN MENU                          CLEAR TRIGGERS?>       CLEAR TRIGGERS?>       CLEAR TRIGGERS?>
 status system  ENTER                  (ENT = Yes)    ENTER   (ENT again)   ENTER   (..DONE.. )
```
Figure 14 Clearing all Triggers

First, the entire Trigger memory should be cleared. In the MAIN MENU, navigate to the "system" sub-menu choice and press ENTER. Press NEXT several times until the CLEAR TRIGGERS menu is displayed. Now press ENTER three times. This will cause all triggers to be initialized as "disabled".

Turning a Channel On When a DMX Level Occurs

In the above trigger list, it doesn't matter which trigger is programmed first, however, let's program trigger number 2 first. For trigger number 2 we add the following trigger details:

Trigger Number	Trigger recipient	Stimulus	Action Taken

2   dimmer channel #2, 25%   DMX channel 3, level > 50   turn channel on

Starting at the MAIN MENU, follow the screens and keystrokes in the following figures to program trigger number 2:

```
NOTE: Whenever a field is INVERSE BLINKING, you must press ENTER for the change to be
accepted. However, the ENTER keypress is not shown in the following flowchart for
reasons of clarity.
```
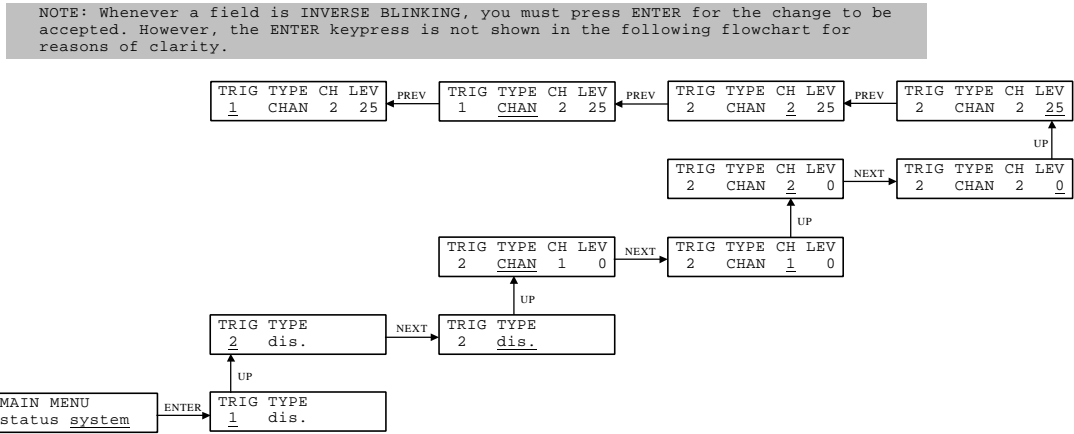
```
TRIG TYPE CH LEV  PREV  TRIG TYPE CH LEV  PREV  TRIG TYPE CH LEV  PREV  TRIG TYPE CH LEV
 1   CHAN  2  25  <---   1   CHAN  2  25  <---   2   CHAN  2  25  <---   2   CHAN  2  25
                                                                                      ^
                                                                                      | UP
                                         TRIG TYPE CH LEV  NEXT  TRIG TYPE CH LEV
                                          2   CHAN  2   0  <---   2   CHAN  2   0
                                                                        ^
                                                                        | UP
                    TRIG TYPE CH LEV  NEXT  TRIG TYPE CH LEV
                     2   CHAN  1   0  <---   2   CHAN  1   0
                            ^
                            | UP
       TRIG TYPE   NEXT  TRIG TYPE
        2   dis.  <---    2   dis.
          ^
          | UP
MAIN MENU    ENTER  TRIG TYPE
status system  --->  1   dis.
```

Figure 15 Selecting a Dimmer Channel for Triggerring

```
                                                                TRIGGER AT DMX:
                                                                ADDR:  3 LEV: 52
                                                                        ^
                                                                        | UP
                                                                        | (HOLD)
                              TRIGGER AT DMX:  NEXT  TRIGGER AT DMX:
                              ADDR:  3 LEV:  0  --->  ADDR:  3 LEV:  0
                                      ^
                                      | UP
                              TRIGGER AT DMX:
                              ADDR:  2 LEV:  0
                                      ^
                                      | UP
                              TRIGGER AT DMX:
                              ADDR:  1 LEV:  0
                                      ^
                                      | UP
       TRIGGER EVENT:  NEXT  TRIGGER AT DMX:
        2   dmx value >  <---  ADDR:  0 LEV:  0
              ^
              | UP
TRIG TYPE CH LEV  ENTER  TRIGGER ACTION:  NEXT  TRIGGER EVENT:
 2   CHAN  2  25  --->    2   turn on  >   --->   2   timeofday >
```
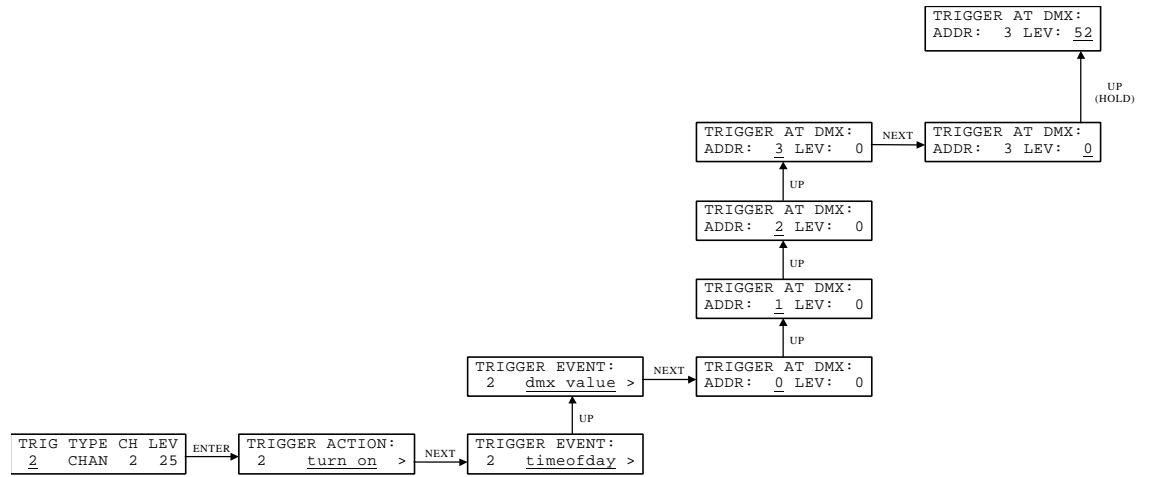
Figure 16 Selecting Trigger Action, Trigger Event, and DMX address and level.

Assuming there is a working console attached to the DMX input connector, dimmer output channel #2 can now be turned full-on by raising the channel 3 fader to more than 50%.

Note that the DMX trigger is a one-way event. Lowering fader #3 to less than 50% will not turn off channel 2 output. Also, keeping the fader above 50% will not be guaranteed to keep channel 2 on, should another trigger occur that turns it off. The DMX level trigger is satisfied one time, when the DMX level transitions in a positive direction through through the threshold level. Lowering the DMX level to below the threshold will re-enable the trigger.

Turning a Channel Off at a Particular Time

Now lets program the same channel to turn off a few minutes from now. Using the figures below, we program the following characteristics into trigger number 1:

Trigger Number	Trigger recipient	Stimulus	Action Taken
1	dimmer channel #2	Time of day: Thu 4:30 PM	turn channel off

Again, follow the screens and keystrokes in the following figures to program trigger number 1:
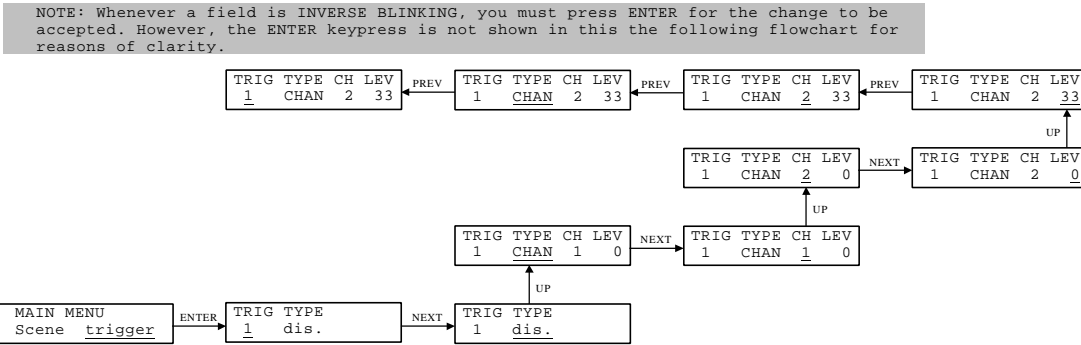
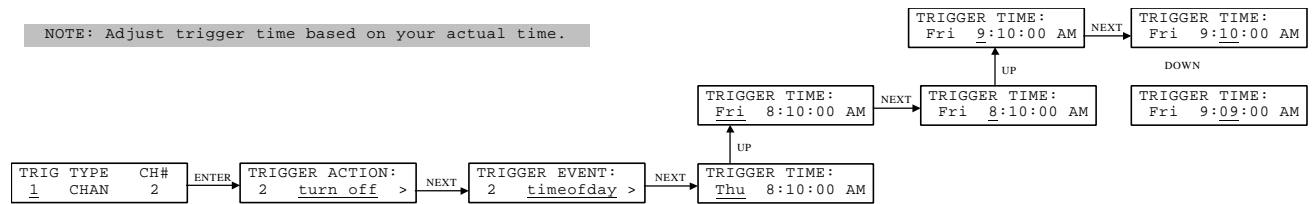
Figure 17 Selecting a Dimmer Channel to Trigger

Figure 18 Selecting Trigger Action, Trigger Event, and Time-of-day for Channel Off Trigger

Starting the Cue Stack Based on Time of Day

Finally, lets program the Cue Stack to start a few minutes from now. First, program the three step cue stack from the tutorial above. Next, modify trigger number 3 to invoke the cue stack by programming these paramters:

Trigger Number	Trigger recipient	Stimulus	Action Taken
3	Scene #2	Time of day: Thu 4:35 PM	turn on cue stack

Again, follow the screens and keystrokes in the following figures to program trigger number 3:
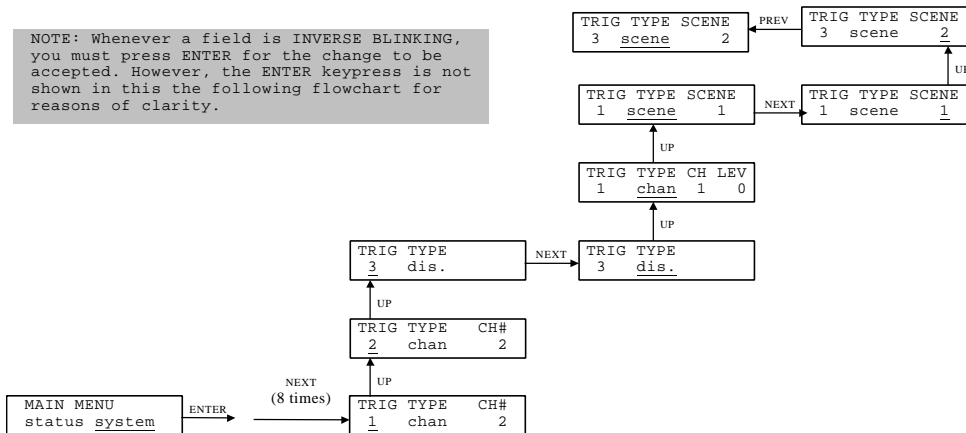
Figure 19 Selecting a Cue Stack Step (Scene) to Trigger

NOTE: Adjust trigger time based on your actual time.

```
                                                                                TRIGGER TIME:
                                                                                  Fri  9:15:00 AM
                                                                                          |
                                                                                          UP

                                                   TRIGGER TIME:     NEXT      TRIGGER TIME:
                                                     Fri  9:10:00 AM           Fri  9:10:00 AM
                                                          |
                                                          UP

                              TRIGGER TIME:     NEXT   TRIGGER TIME:
                                Fri  8:10:00 AM        Fri  8:10:00 AM
                                      |
                                      UP

  TRIG TYPE SCENE   ENTER  TRIGGER ACTION:   NEXT  TRIGGER EVENT:   NEXT  TRIGGER TIME:
  3   scene    2           3   turn on   >         3   timeofday >        Thu  8:10:00 AM
```
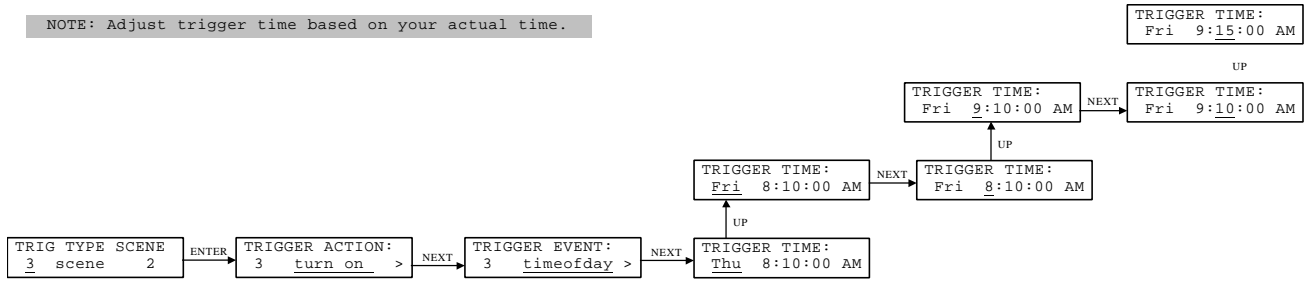
Figure 20 Selecting Trigger Action, Trigger Event, and Time-of-day for Scene On Trigger

Comprehensive Menu Reference

This section shows the main menu tree, the four major sub menu trees, and attempts to describe how to access every programmable feature in the system.

How to Use the Interface

The programmable features of the LWD-2400 are accessed through a series of LCD screens that collectively make up the menu tree. At the top level of the tree is the Main Menu. You can return to the Main Menu level (shown below) at any time by repeatedly pressing the key labeled PREV, and which stands for "PREVIOUS".

From the main menu, you can go into any one of major sub menu groups: Dimmers, Scenes, Status and System.

A Typical Menu Screen

In this section each sub menu is shown as it might appear on the LCD using a format similar to this:
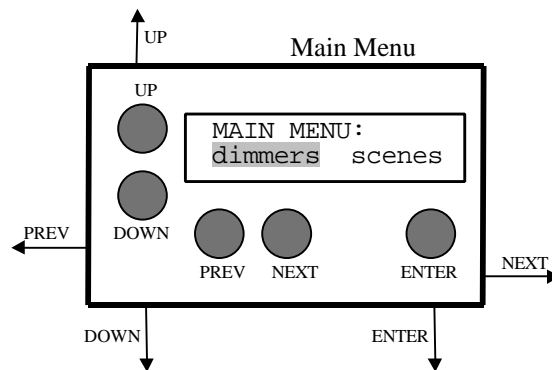
Figure 21 A typical Menu Screen

The name of the sub menu being described is at the top of the box, in this case "Main Menu". The arrows indicate which direction you move in the menu tree when a particular button is pressed. First some basics of what the switches do and how to interpret different character attributes.

Using the Buttons

There are five buttons positioned around 2-line x 16-character LCD that provide the user interface. Menu screens and parameter choices are presented on the LCD. The buttons are used to move between menus, and to select, view and modify parameters. The buttons are:

PREVious	Takes you to the previous menu screen or field.
NEXT	Takes you to the next available menu screen or field.
UP	Used to traverse up a menu tree, or to increase a modifiable field.
DOWN	Used to traverse down a menu tree, or to decrease a modifiable field.

ENTER   One of two effects. Will take you to a sub menu when the current field is a sub menu entry point (blank blink). Or it will write field value that you have modified by pressing the UP or DOWN keys (inverse blink).

Blinking Fields

Each screen is composed of "fields". The current field will blink, indicating where you are in the menu. How a field blinks tells what type of field it is and something about its current state:

Blank blink   A sub menu entry point. Press ENTER to go down one menu level.

Underline blink   A modifiable parameter that has not yet been modified. Press UP or DOWN keys to change a parameter. In some cases, the changes are instantaneous, while in others, the field will begin to reverse blink, and the ENTER button must be pressed to accept the change.

Reverse blink   A modified parameter that has been changed. Keep pressing UP or DOWN to modify further, or press ENTER to accept the changed parameter. To ABORT the changes, simply refrain from pressing any buttons for about five seconds, or press the PREV or NEXT buttons. The original unmodified value of the parameter will be redisplayed.

The MAIN Menu
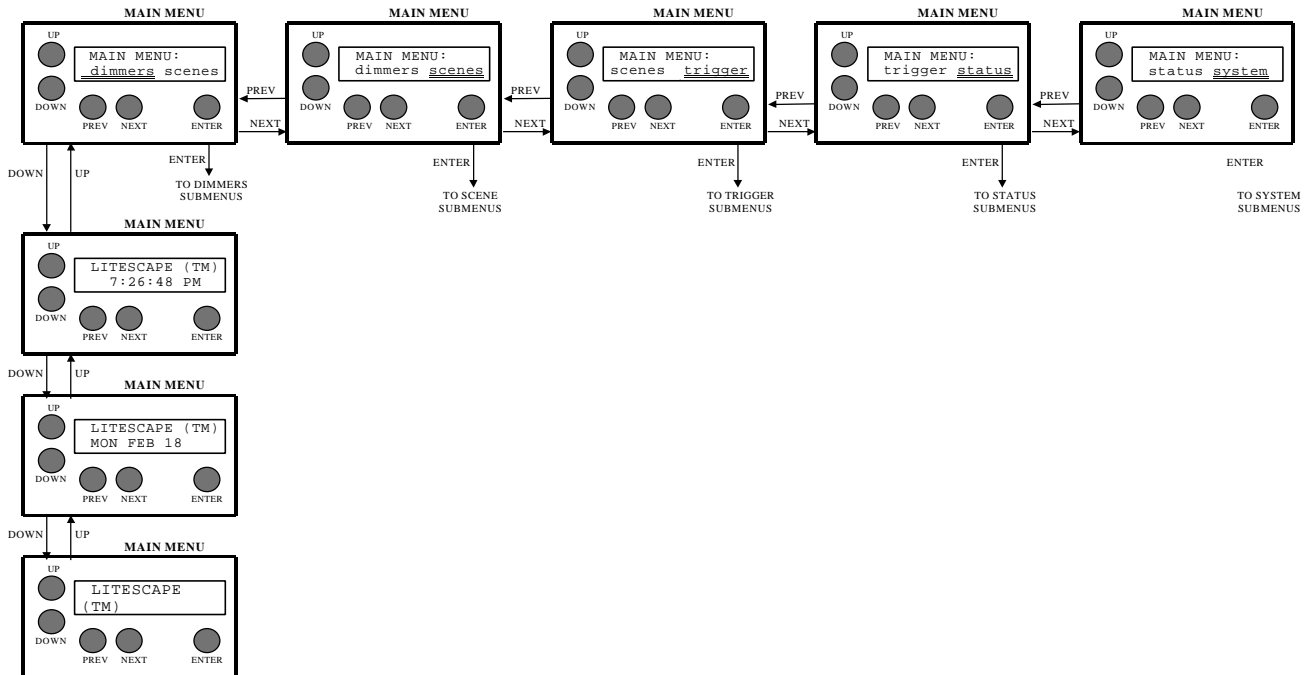
Figure 22 The MAIN MENU

Line one shows the LEPRECON name along with the product description. At any time, press UP or DOWN to display additional information on line one, for example, revision numbers, serial numbers, etc.

Selecting a Sub Menu

Line two presents the various submenu choices. Use the NEXT and PREV buttons to highlight the area of interest on line two, then press ENTER to proceed to the sub menu. The general types of paramters which are available for viewing or modification in the various sub menus is described briefly next:

DIMMERS
Select this field to view or change the name a WALL DIMMER, to modify it's BASE ADDRESS, or to change the CURVE characteristics for individual dimmer CHANNELS.

SCENES
Select this field to view or change the attributes of the up-to 100 SCENES. Attributes associated with SCENES include STATE, FADE TIME, DELAY TIME, NEXT LINK, and CHANNEL LEVELS.

TRIGGER
Select this field to view or change the attributes of the up-to 100 TRIGGERS. Attributes associated with TRIGGERS include TRIGGER TYPE, ACTION, EVENT, DMX LEVEL, and TIME OF DAY.

STATUS
Select this field to view various system STATUS variables, including DMX, TEMPERATURE, and LINE VOLTAGE.

SYSTEM
Select this field to view or change the varous SYSTEM related variables, such as DEFAULT FADE
TIMES. It is also possible to initialize the SYSTEM paramaters to their default condition. This
includes DIMMERS, ROOMS, ZONES, SCENES and ALL.

The DIMMER Menus
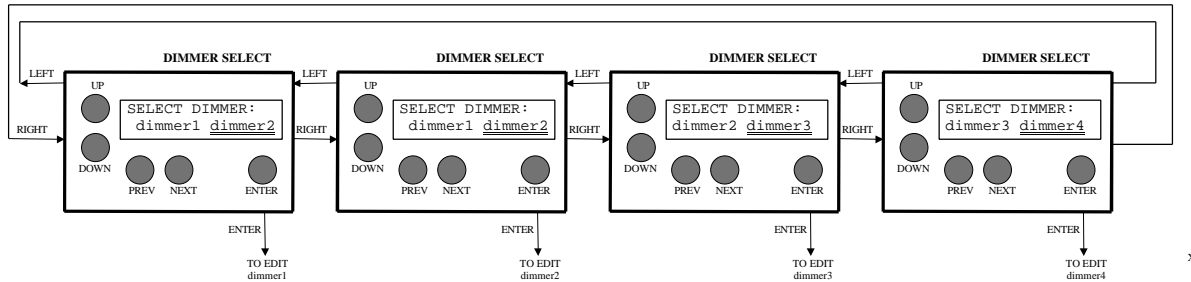
Figure 23 The DIMMER SELECT Menu

DIMMER SELECT Menu

The DIMMER SELECT menu is show above. Pressing PREV and NEXT cycles through all available, recognized WALL DIMMERS (up-to 4). Pressing ENTER will select the dimmer for viewing or editing, as shown next. To return to the MAIN MENU, press ENTER again without pressing any other button, or refrain from pressing any button for about 5 seconds.
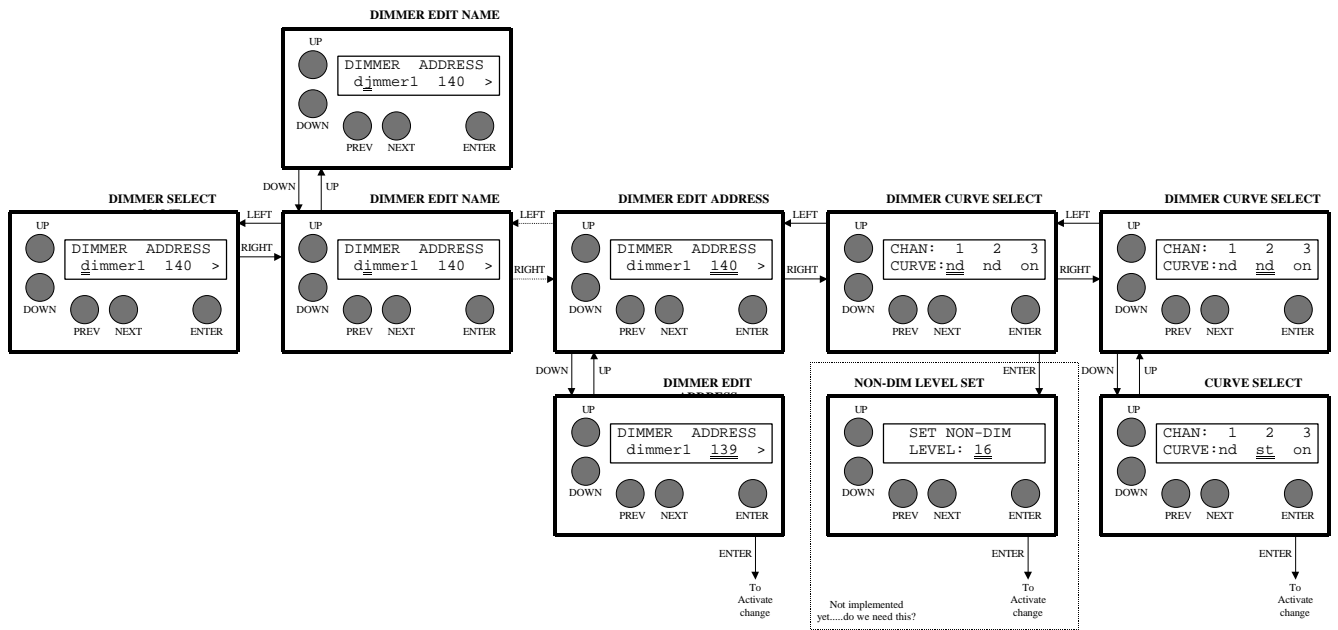
Figure 24 The DIMMER Sub Menus

DIMMER EDIT NAME
Characters are selected for editing using the PREV and NEXT buttons. The selected character is changed using the UP and DOWN keys. When satisfied, press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons.

DIMMER EDIT ADDRRESS
The currrently active DMX start address is displayed (1-512). Press the UP and DOWN buttons to select a new starting address. When not the currently active start address, the displayed address will blink. To cancel changes,

press the PREV or NEXT buttons. To acitvate the new START ADDRESS, you must press ENTER. The displayed address will stop blinking when activated.

DIMMER CURVE SELECT

Press PREV or NEXT to select a channel for consideration. Press UP or DOWN to modify the CURVE type for that channel. For the CURVE type field, "st" means Standard curve, "nd" means "Non-Dim", and ON/OFF are self explanatory test modes. If the displayed CURVE is different from the currently active curve, the displayed value will blink. When satisfied, press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons.
 The displayed address will stop blinking when activated.

The SCENE Menus
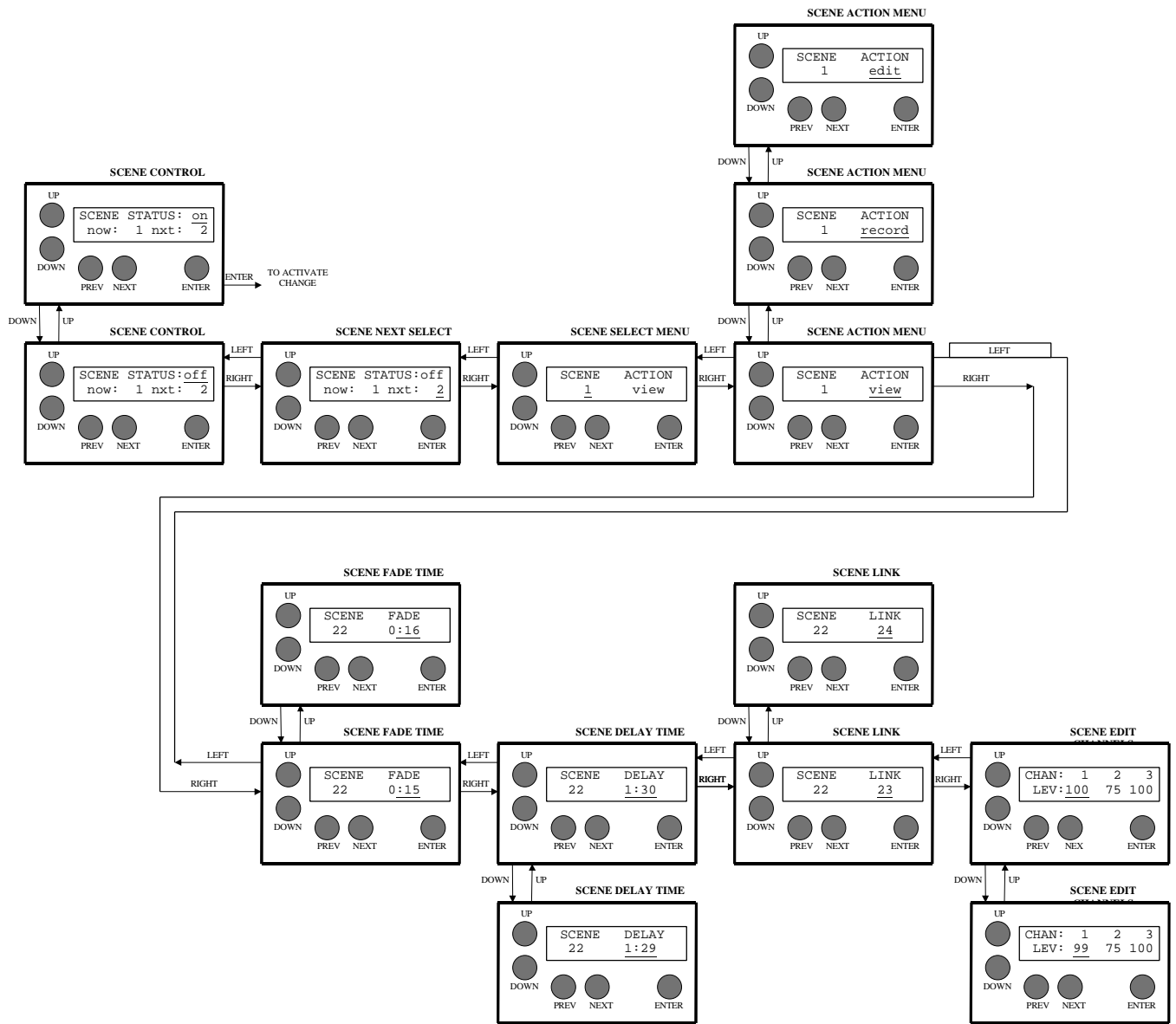
Figure 25 The SCENE Sub Menus

SCENE CONTROL
Displays the state of the SCENE feature Press UP or DOWN to select an alternate state, then press ENTER to activate the change.

SCENE NEXT SELECT
When the SCENCE feature in the OFF state,, this menu is used to select any one of the 100 available SCENES as the "nxt" scene. Press ENTER to accept the change, then go back to the SCENE CONTROL menu and turn the scene feature back "ON".

SCENE SELECT

Press UP or DOWN to select any one of the 100 available SCENES for viewing or editing. Press ENTER to select the SCENE and proceed to the next menu. In the WALL DIMMER, a SCENE is defined as a programmable set of output levels on a channel basis. It is like a CUE STACK on the LP1500/1600 consoles, and should not be confused with programmable PRESETS which are associated with HOUSE LIGHTS panels and ZONES within ROOMS.

SCENE ACTION

Press UP or DOWN to toggle the ACTION between view, record and edit. View means a blind-edit of the dimmer's scene database, snapshot records the dmx input stream to the selected scene, and edit invokes a live-output edit of the selected scene.. To return to the previous menu, press PREV as required.

SCENE FADE TIME

Press UP or DOWN to change the FADE TIME from 0:00 to 120:00. When the displayed FADE TIME is different from the currently active FADE TIME, the displayed value will blink. When satisfied, press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons. The displayed FADE TIME will stop blinking when activated. To return to the previous menu, press PREV as required.

SCENE DELAY TIME

Press UP or DOWN to change the DELAY TIME from 0:00 to 120:00. When the displayed DELAY TIME is different from the currently active DELAY TIME, the displayed value will blink. When satisfied, press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons. The displayed DELAY TIME will stop blinking when activated. To return to the previous menu, press PREV as required.

SCENE LINK

Press UP or DOWN to change the LINK from 0 to 100. When the displayed LINK is different from the currently active LINK, the displayed value will blink. When satisfied, press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons. The displayed LINK will stop blinking when activated. To return to the previous menu, press PREV as required.

SCENE EDIT CHANNELS

Select and modify channel levels using the PREV, NEXT, UP and DOWN buttons. Changes are recorded instantly, that is, there is no need to press ENTER to record the changes. Furthermore, if the SCENE being edited is the currently active scene, the dimmers will show a "live" edit. To return to the previous screen, press PREV as required.
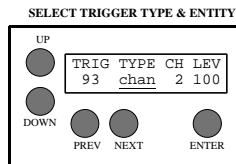
The TRIGGER Menus
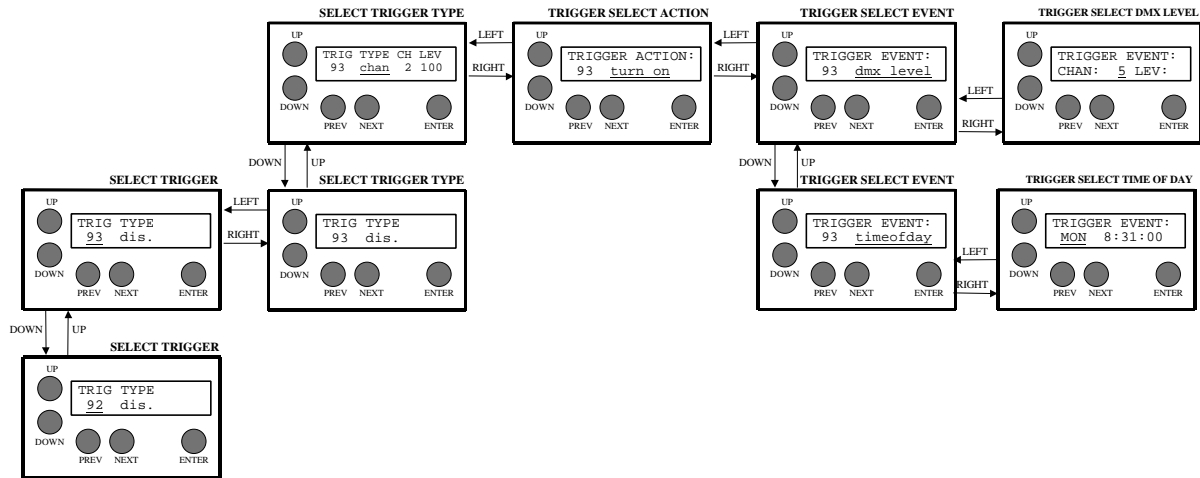
TRIGGER SELECT TRIGGER
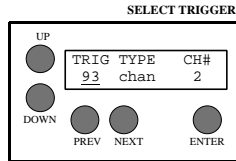
Press UP or DOWN to select the trigger to modify, numbered 1 through 100. As you scroll through triggers, the trigger's current TYPE and ENTITY field are displayed. They can be modified by pressing NEXT and proceeding to the SELECT TYPE and ENTITY menu.

TRIGGER SELECT TYPE and ENTITY

The currently selected trigger's TYPE and ENTITY field are displayed in fields 2 & 3. They can be modified by pressing UP and DOWN according to the following:

If field 2 is:	Then field 3 is:
Disabled	absent
Channel	a dimmer channel number from 1-12 (or 24, 36 or 48), and field 4 is the desired channel output level.
Scene	a scnene number between 1 and 100

When satisfied, you must press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons without pressing ENTER.

TRIGGER SELECT ACTION
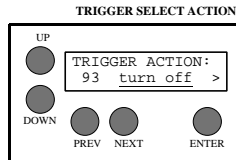
Press UP or DOWN to select between these available ACTIONS:

Turn off -   The selected entity is turned off when the trigger is satisfied.
Turn on -   Entity is turned on.
Toggle   -   The entity is turned off if currently on, and vica-versa.

When satisfied, you must press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons without pressing ENTER. Press NEXT to proceed to the TRIGGER EVENT menu.
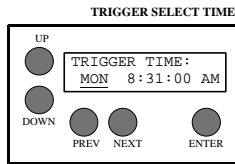
TRIGGER SELECT EVENT

TRIGGER SELECT EVENT

```
        UP
    ○  ┌──────────────────┐
       │ TRIGGER EVENT:   │
       │ 93  timeofday >  │
    ○  └──────────────────┘
  DOWN  ○      ○        ○
      PREV   NEXT    ENTER
```
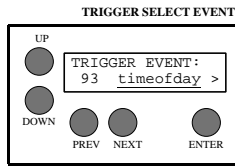
Press UP or DOWN to select between these available EVENTS:

Field	Description
Time of day -	Define a trigger based on time of day
DMX value -	Define a trigger based on the level of a DMX channel

When satisfied, you must press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons without pressing ENTER. Press NEXT to proceed to the applicable EVENT menu.
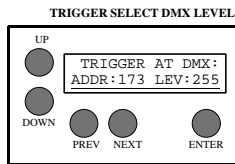
TRIGGER SELECT TIMEOFDAY

TRIGGER SELECT TIME

```
        UP
    ○  ┌──────────────────┐
       │ TRIGGER TIME:    │
       │ MON  8:31:00 AM  │
    ○  └──────────────────┘
  DOWN  ○      ○        ○
      PREV   NEXT    ENTER
```

Press NEXT or PREV to highlight the desired field to modify, then UP or DOWN to select the desired value. Choose between:

Field		Value range
Day	-	Mon, Tue, Wed, Thu, Fri, Sat, Sun, M-F (weekday), S-S (weekend)
Hour	-	1 through 12
Minute	-	0 through 59
Second	-	0 through 59
Half day	-	AM or PM

When satisfied, you must press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons without pressing ENTER.

TRIGGER SELECT DMX LEVEL

TRIGGER SELECT DMX LEVEL

```
        UP
    ○  ┌──────────────────┐
       │ TRIGGER AT DMX:  │
       │ ADDR:173 LEV:255 │
    ○  └──────────────────┘
  DOWN  ○      ○        ○
      PREV   NEXT    ENTER
```

Press NEXT or PREV to highlight either the ADDRess or LEVel fields. Press UP or DOWN to select the desired characteristics:

Field		Value range
Addrress	-	1 through 512
Level	-	1 through 255 (select the DMX level, not the percentage)

When satisfied, you must press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons without pressing ENTER.
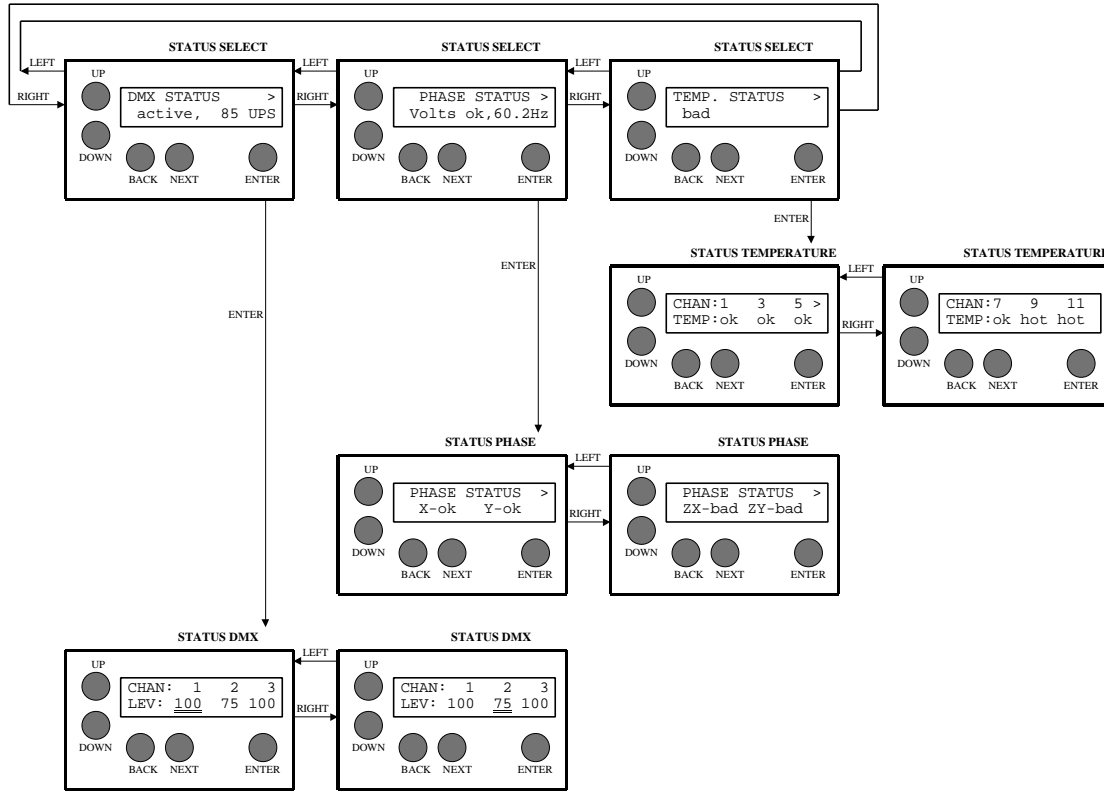
The STATUS Menus

Figure 26 The STATUS Sub Menus

STATUS SELECT

Press PREV or NEXT to select between DMX, TEMPERATURE and PHASE status. A summary status is displayed at this level. Detailed information is available by pressing ENTER. To return to the MAIN MENU, press UP or DOWN.

Note that the summary information displays information about all DIMMERS in the system. For instance, if any POWER MODULE in any DIMMER is hot, then the summary information will say "hot". However, the detailed TEMPERATURE and PHASE STATUS information will only show data for the local dimmer. Therefore, if the POWER MODULE that is hot is not in the local dimmer, then the detailed status information will properly indicate no temperature problems in the local dimmer.

DMX STATUS

Press PREV or NEXT to select a channel (1-512) for viewing. A quick press and release will move the cursor by 1, while holding the button will move the cursor by 10.

TEMPERATURE STATUS

There are 6 POWER MODULES in a WALL DIMMER, and each module drive two CHANNELS. The first screen shows the temperature status of the first three POWER MODULES, which correspond to local channels 1-6. Press NEXT to view the status of the other three modules. Press UP, DOWN or ENTER to return to the STATUS SECLECT menu.

PHASE STATUS

There are 4 virtual PHASES in a WALL DIMMER, regardless of the number of physical PHASES. The first screen shows the status of the X and Y phases. Press NEXT to view the status of the ZX and ZY phases. Press UP, DOWN or ENTER to return to the STATUS SECLECT menu.
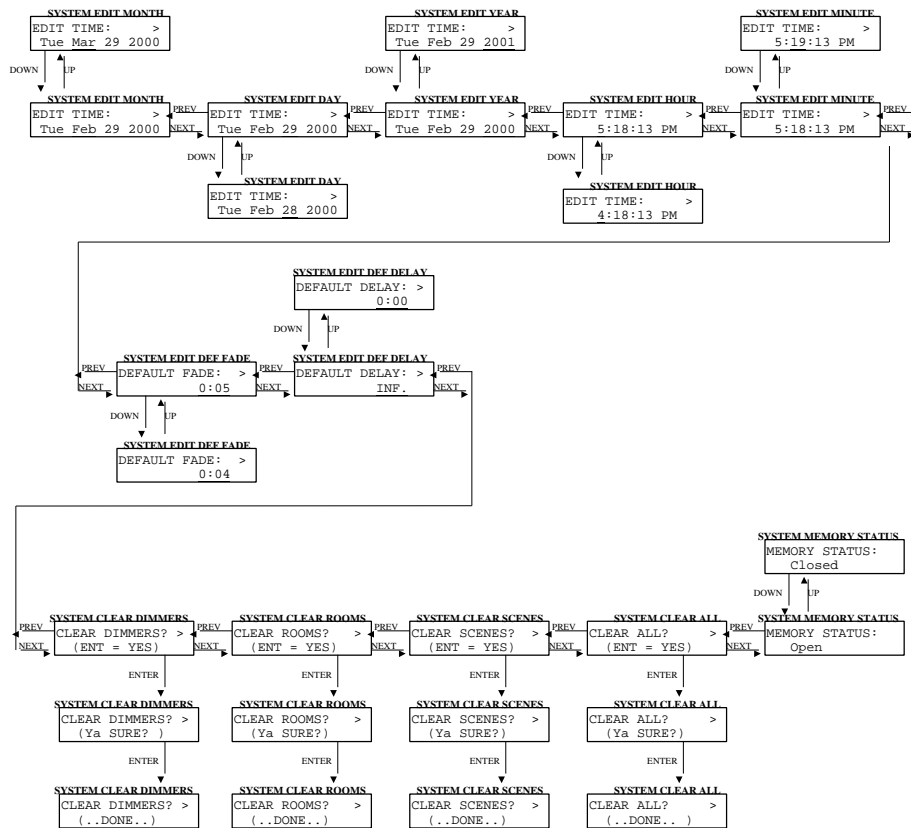
The SYSTEM Menus

Figure 27 The SYSTEM Sub Menus

EDIT MONTH
EDIT DAY
EDIT YEAR
EDIT HOUR
EDIT MINUTE
Press UP or DOWN to modify the selected real time clock (RTC) parameter. When satisfied, press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons.

DEFAULT FADE TIME
DEFAULT DELAY TIME
Press UP or DOWN to modify the DEFAULT FADE TIME. The allowable values and resolutions are:

INFinite
0:00 – 0:59   0 seconds through 0 minutes:59 seconds   1 second increments
1:00 – 9:59   1 minute through 9 minutes:59 seconds   5 second increments
10:00 – 60:00   10 minutes through 60 minutes   15 second increments

When satisfied, you must press the ENTER button to record the changes. To abort changes, press the PREV or NEXT buttons without pressing ENTER.

CLEAR DIMMERS

Press UP or DOWN to toggle the select field to YES, then press ENTER to initiate the action. The "ARE YOU SURE?" question will be displayed. Up to this point, the CLEAR can still be aborted by pressing the PREV or NEXT buttons. To complete the initialization procedure, press the ENTER button.

The four system dimmers are initialized to:

Dimmer	Name	DMX Base Address	Channel Curves
1	dimmer1	1	all 12 channels are set to the "st"andard curve
2	dimmer2	13	"
3	dimmer3	25	"
4	dimmer4	37	"

CLEAR SCENES

Press UP or DOWN to toggle the select field to YES, then press ENTER to initiate the action. The "ARE YOU SURE?" question will be displayed. Up to this point, the CLEAR can still be aborted by pressing the PREV or NEXT buttons. To complete the initialization procedure, press the ENTER button.

The cue stack globals and the 100 individual scenes are initialized to:

Stack State: Off
Now Scene: 1
Nxt Scene: 2
Scene Action: View

Scene	Fade Time	Delay Time	Link	Channel Levels
1	default fade time	INFinite	2	all 48 channels → 0%
2	"	"	3	"
3	"	"	4	"
|	|	|	|	|
|	|	|	|	|
100	"	"	0	"

CLEAR ALL

Press UP or DOWN to toggle the select field to YES, then press ENTER to initiate the action. The "ARE YOU SURE?" question will be displayed. Up to this point, the CLEAR can still be aborted by pressing the PREV or NEXT buttons. To complete the initialization procedure, press the ENTER button.

The dimmer and cue stack variablesare initialized to as described above. Several additional variables are also initialized:

Default Fade Time: 0:05 seconds

MEMORY STATUS

Press UP or DOWN to toggle the select field between "Open" and "Closed". When "Closed", most programmable features can be viewed but are unavailable for modification.

To enable modification of all programmable features, set this field to "Open". When programming is complete or whenever it is desirable to lockout any undesired tampering, set this field to "Closed".