

NSI
MODULAR DIGITAL DIMMING SYSTEM
DS8/DS12 DIMMER PACKS
INSTALLATION AND OPERATION GUIDE

Version 1.1x Software
Part Number LIT-31665-0 Rev B – 9/25/2000

Specifications

Number of Channels:	Model DS8-12 : 8 channels Model DS12-12 : 12 channels Model DS8-24 : 8 channels Model DS12-24 : 12 channels
Output Capacity:	Model DS8-12 : 1200 Watts per channel @ 120VAC Model DS12-12 : 1200 Watts per channel @ 120VAC Model DS8-24 : 2400 Watts per channel @ 120VAC Model DS12-24 : 2400 Watts per channel @ 120VAC
Input Power:	Model DS8-12 : 1 phase, 3 wire, 120/240 VAC, 40 Amps, 47 – 63Hz Model DS12-12 : 1 phase, 3 wire, 120/240 VAC, 60 Amps, 47 – 63Hz or 3 phase, 4 wire, 120/208 VAC, 40 Amps, 47 – 63Hz Model DS8-24 : 1 phase, 3 wire, 120/240 VAC, 80 Amps, 47 – 63Hz Model DS12-24 : 1 phase, 3 wire, 120/240 VAC, 125 Amps, 47 – 63Hz or 3 phase, 4 wire, 120/208 VAC, 80 Amps, 47 – 63Hz
Dimmer control system:	Microprocessor digital phase control.
Load Filtering:	350 μ s
Control Input Types:	12 channels of 0 -10VDC [15 pin Male D-Sub on back of pack] Pins 1 through 12 = Channels 1 through 12, pin 13 = T/C, Pin 14 = +14.4VDC, Pin 15 = Analog COM MICROPLEX (in / through) on 3 pin XLR connector DMX-512 (in / through) on 5 pin XLR connector Luma-Net - 6 pin Terminal Block
Control Wiring:	Class 2 low voltage
Output Panels:	PB8/12 – 1 - NEMA 5-15 or 5-20 receptacle per channel or, SP8/12 – 1- 20 Amp stage pin receptacle per channel or, KO8/12 – hard-wired terminal blocks.
Cooling System:	Thermostatically controlled and monitored fan forced air with individual dimmer module temperature monitoring. Fan exhaust on right rear side.
Dimensions:	3.5"High x 17.2" Wide x 17.0"Deep. (2 EIA 19" Rack Spaces)
Weight:	50lbs
Recommended Ambient Operating Temperature:	0-25 degrees C (32 - 85 degrees F)
Short-Circuit Current Rating:	10,000A RMS Sym. @ 240VAC
Load Type:	AC lighting loads only
Enclosure Type:	For indoor use only Utilizer dans un endroit a l'abri

Mounting

The DS dimmer packs are designed to be mounted in a standard 19" EIA rack. The packs are provided with two mounting flanges or ears, which are designed for securing the pack to the front rack mounting rails. The pack may also be operated as is on top of a sturdy table or shelf.

An optional rear support kit is available and should be used in portable, or rough handling rack mount applications.

The NSI DS dimmers depend on forced air cooling, therefore the following installation rules apply:

- 1. The rack enclosure shall maintain a 2 inch minimum clearance on the entire right side of the dimmer rack enclosure for air exhaust. The rack enclosure must not be sealed, and must maintain an air exhaust clearance area of at least 15 square inches per installed pack for air to flow back to the ambient room.**
- 2. If the optional rear support kit is used, the right rear support bracket must be cropped to a length that does not block any of the air exhaust vent on the right side of the rack, once the pack is installed. Support bracket length can vary depending on cabinet construction and manufacturer, therefore the bracket should be cropped upon installation.**
- 3. The intake manifold on the front of the dimmer pack cannot not be blocked for any reason.**
- 4. The thermal operation of the dimmer pack will depend on its conditions of installation. Ambient room temperature must never exceed 104 degrees F or 40 degrees C.**

WARNING: If any of the cooling rules above are violated, the packs could suffer permanent damage not covered under warranty.

Input Power Wiring

WARNING: Because DS packs operate at potentially lethal voltages, installation wiring should be done by qualified personnel only!

WARNING: Do no connect chassis Ground to Neutral, or operate this equipment without a chassis ground, otherwise the user could be exposed to potentially lethal voltages.

The DS dimmer pack must be fed with one of the electrical services listed below. The service should be protected by a suitable circuit breaker. Wiring should be selected, sized and installed in accordance with local electrical codes as should all aspects of the installation. All wire must be copper, and be rated for 90°C sized for 75°C ampacity.

For convenience, suggested portable cord sizes are shown in parenthesis. They are sized for the full capacity of the dimmer pack and for the 60°C-rated plug that is likely to be installed on the other end.

Model DS8-12: 1 phase, 3 wire plus ground, 120/240 VAC, 40 Amps, 47 – 63Hz
(Type S/SO, 4 conductor, #6 AWG minimum)

Model DS12-12: 3 phase, 4 wire, 120/208 VAC, 40 Amps, 47 – 63Hz
(Type S/SO, 5 conductor, #4 AWG minimum)

1 phase, 3 wire, 120/240 VAC, 60 Amps, 47 – 63Hz SEE RE-WIRING PROCEDURE
(Type S/SO, 4 conductor, #2 AWG minimum)

Model DS8-24: 1 phase, 3 wire, 120/240 VAC, 80 Amps, 47 – 63Hz
(Type S/SO, 4 conductor, #2 AWG minimum)

Model DS12-24: 3 phase, 4 wire, 120/208 VAC, 80 Amps, 47 – 63Hz
(Type W, 5 conductor, #2 AWG minimum)
(Type G, 4 conductor, #2 AWG minimum)

1 phase, 3 wire, 120/240 VAC, 125 Amps, 47 - 63hz SEE RE-WIRING PROCEDURE
(Type W, 4 conductor, #1 AWG minimum)
(Type G, 3 conductor, #1 AWG minimum)

Connect input feeder wires to labeled input terminal terminals provided.

Feeder re-wiring procedure for 12 channel single phase units:

1. All power feeders should be turned off and disconnected.
2. Remove the dimmer pack cover by removing the screws around the edge.
3. Using a flat blade screwdriver, disconnect the 18 AWG red control module power wire from the B phase power feed terminal block, and move it to the C phase power feed terminal block along with the #18 AWG blue control module power wire, and terminate using set screw torqued to 35 inch-lbs.
4. Using a flat blade screwdriver, disconnect the red dimmer module feeder wire pairs with the single and double red tie-wraps (dimmers 5&6 and 7&8) by unscrewing the set screws in the B phase power feed terminal block, and sliding the wires out of the back slot.
5. Move the red dimmer module feeder wire pair with the single red tie-wrap to the A phase power feed terminal block, slide in the wires deep in the terminal block mounting holes so no wire is exposed past the walls of the block, and terminate using set screw torqued to 35 inch-lbs.
6. Move the red dimmer module feeder wire pair with the double red tie-wraps to the C phase power feed terminal block, slide in the wires deep in the terminal block mounting holes so no wire is exposed past the walls of the block, and terminate using set screw torqued to 35 inch-lbs.
7. Cross check:
 - All black tie-wrapped and single red tie-wrapped feed wire pairs, and the Phase A black 18AWG control module power wire should be fed by the Phase A feeder block
 - All blue tie-wrapped and double red tie-wrapped feed wire pairs, phase B red 18AWG control module power wire, and the phase C blue 18AWG control module should be fed by Phase C feeder block.
 - Phase B feeder block should be empty.
 - All load connections should be not exposed, and terminated tightly to 35 inch-lbs.

Output Power Wiring

DS packs are available in a variety of configurations. NEMA 5-15 or 5-20 receptacle, or Stage Pin receptacle models feature one output receptacle per dimming circuit, while the hard-wired packs feature terminal blocks and a rear panel with knock-outs.

The lighting load connected to the dimming circuit should be rated for 115/120V and should not exceed the rating of the dimmer. The ampacity of the dimmer can be seen in the window near the yellow led load indicator on the front panel, 10 = 10 Amps, 20 = 20 Amps.

The dimmer is capable of driving incandescent, Advance MARK X fluorescent ballasted, or inductive transformer loads. The load on the dimmer must include the load of the lamp plus the load of the ballast or transformer; and each ballast or transformer must be individually fused. Transformers should be over-rated by at an additional 70% of their rated load when operating on an SCR dimming circuit. Other loads may be unsuitable to operation by a SCR based switching devices, and may operate in an erratic and/or unpredictable fashion. Contact the manufacturer of the load equipment for details of their power specification.

The proper wiring of a Stage Pin receptacle is not always evident. The center pin is the green grounding conductor; the pin nearest the ground pin is the white grounded (neutral) conductor; and the remaining pin is the ungrounded (hot) conductor.

Control Wiring

DMX-512:	Input = 5 pin XLR-M	<u>Pin#</u>	<u>Signal</u>
	Through Output = 5 pin XLR-F	1	DGND
		2	DATA -
	Recommended	3	DATA +
	Control Wire: Belden 9729 or 9829	4	THROUGH
	5	THROUGH	
Microplex: (MPX)	Input = 3 pin XLR-M	<u>Pin#</u>	<u>Signal</u>
	Through Output = 3 pin XLR-F	1	Analog COM
		2	+14.4VDC Power
	Recommended	3	DATA
Control Wire: Belden 8760 or 9460			
0-10VDC: Analog	Input = 15 pin M D-Sub	<u>Pin#</u>	<u>Signal</u>
		1	Channel 1
	Recommended	2	Channel 2
	Control Wire:	3	Channel 3
	Alpha 1896	4	Channel 4
		5	Channel 5
		6	Channel 6
		7	Channel 7
		8	Channel 8
		9	Channel 9
		10	Channel 10
		11	Channel 11
		12	Channel 12
		13	T/C (Snapshot)
		14	+14.4VDC Power
	15	Analog COM	
Luma-Net	Input = 6 pin pluggable terminal block	<u>Pin#</u>	<u>Signal</u>
	Orientation: looking at back of pack, with grooved surface on bottom.	1 (far right)	REM +
		2	REM -
	Recommended	3	DGND
	Control Wire:	4	+14.4VDC Power
	Alpha 1898	5	N/C
	6 (far left)	N/C	

IMPORTANT NOTE: Do not route low voltage control wires parallel to or in the same conduit as high voltage power wires as the control system may exhibit erratic control performance. (like flickering)

DS Pack Operation

The Operation of the DS Pack has been divided into the following sections:

1. Turn Lights On...Now!
2. Setup
3. Softpatch
4. Analog Submasters
5. Presets
6. Dimmer Feedback
7. Control Module Jumper Settings
8. Contact NSI

Section 1

To turn lights on now:

1. Make sure all three red led power indicators on the front are lit.
2. Make sure lighting loads are plugged into back of pack .
3. Flip all circuit breakers up to "ON" position.
4. Press test switch oval under each circuit breaker.

1.1 Setting the Test Switch Bump or Latch action and level:

If the test switches have been configured as " latch" action, the lights will stay on at the first press of the test switch, but if the test switches have been configured as "bump" action, they will only stay on as long as they are pressed.

To change the test switch action, and the test switch intensity, press [CLEAR] until the following menu is displayed:

```
NSI DSxx  xPHASE          Note: the 'x's could indicate a variety of settings
STATUS=xxx [MORE]
```

Now press the switch under [MORE] twice. This switch is a *soft switch*, that is, the function of the switch is defined by the bracketed text in the LCD window above. If you are lost or make a mis-entry, just hit [CLEAR]. The menu will back up one position or one menu each time [CLEAR] is pressed. The LCD should now display:

```
NSI DSxx  xPHASE
[SETUP]   [MORE]
```

Press the soft switch under [SETUP]. Then press [MORE] 2 times. The screen should now display :

```
SET TEST SWITCH
[ACTION] [MORE]
```

Select [ACTION]. Two choices will be displayed [LATCH] and [BUMP]. Press the test function you prefer. This selection will stay in permanent EEPROM memory. Upon selection, another choice will appear:

```
SET TEST LEVEL = 25%
[CHANGE]      [MORE]
```

If you wish to change the output intensity of the bump switches, select [CHANGE]. This change is in volatile memory, or RAM , so it will go back to 25% when the power to the pack turned off. The level setting will not take effect, however, until the test switch is activated again.

Section 2 SETUP

The DS dimmer pack will be ship pre-configured with factory default settings, however, it may be necessary to change some of those settings in the field based on installation requirements or service conditions. The following section steps through the various control setup options.

2.1 Number of dimmers selection:

Press [CLEAR] until the following main menu is displayed:

NSI DS_{xx} xPHASE **Note:** the 'x's could indicate a variety of settings
STATUS=_{xxx} [MORE]

Now press the switch under [MORE] twice. This switch is a *soft switch*, that is, the function of the switch is defined by the bracketed text in the LCD window above. If you are lost or make a mis-entry, just hit [CLEAR]. The menu will back up one position or one menu each time [CLEAR] is pressed. The LCD should now display:

NSI DS_{xx} xPHASE
[SETUP] [MORE]

Press the softswitch under [SETUP]. The first setup menu will appear:

SET # OF DIMMERS
[8/12] [MORE]

The control module can operate either a 8 channel or 12 channel dimmer pack, but it needs to be told how many dimmers are in the pack. If you wish to change the number of dimmers, press the [8/12] soft switch. The next selection you make will be permanently stored in the non-volatile EEPROM configuration chip. The LCD will display:

OF DIMMERS =
[8] [12]

Select the number of dimmers that are installed in the pack, or press [CLEAR] to go back to the previous menu. If you change settings, the changes will not be reflected until the pack is powered off, and then back on. A number selection will return to the display to the main menu.

2.2 Phase power selection:

From the main menu:

NSI DS_{xx} xPHASE **Note:** the 'x's could indicate a variety of settings
STATUS=_{xxx} [MORE]

Press the key sequence [MORE], [MORE], [SETUP], [MORE]. The following menu will be displayed:

SET PHASE POWER
[1/3 PHASE] [MORE]

An 8 channel dimmer pack will always be setup for 1 phase. A 12 channel dimmer pack may operate as either a single phase or 3 phase unit. Single phase 12 channel units need to be internally configured for single phase power, so for single phase 12 channel units, refer to Input Power Wiring section and Re-wiring Procedure. If the wrong phase power type is selected from the LCD menu no damage will occur to the dimmer pack, but it will not operate correctly and may operate as a non-dim or with odd dimming curves. Like with the number of dimmers selection, phase control selection is stored in non-volatile EEPROM and configures on power-up, therefore the pack must be powered off and back on to have phase changes implemented.

2.3 Test Switch Action / Level Selection:

From the main menu:

NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]

Note: the 'x's could indicate a variety of settings

Press the key sequence [MORE], [MORE], [SETUP], [MORE] [MORE]. The following menu will be displayed:

SET TEST SWITCH
[ACTION] [MORE]

Select [ACTION]. The following menu will be displayed:

SWITCH ACTION =
[LATCH] [BUMP]

If you select [LATCH], the dimmer channel will toggle between the bump level and off each time the test switch under the circuit breaker is pressed. If you select [BUMP], the dimmer channel will turn on only while the test switch is being pressed. After selecting the test switch action, the following menu will appear:

SET TEST LVL = 25%
[CHANGE] [MORE]

If you wish to change the test switch bump level, press change, then enter the 'on' control level you wish the channels to bump or latch to. Note: the bump level selection is only stored in ram, so it will default back to 25% when the pack is powered off.

2.4 Analog Input Defaults Selection:

The 0-10VDC analog inputs on this DS dimmer pack do not have to be just 0-10VDC control inputs for single channel dimmer control. The analog inputs can also operate as overlapping submaster scenes with time fade damping, or trigger inputs to linked presets that can operate in a chase pattern on one of the analog submasters. To program these functions, refer to the Analog Submaster section of this manual. **Enabling [DEFAULTS] in this menu will erase all the submaster scenes and their fade times, and re-program all inputs to a 1 to 1 patch with 0 time fade damping.** (analog input 1 = channel 1, analog input 2 = channel 2, ... analog input 12 = channel 12).

From the main menu:

NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]

Press the key sequence [MORE], [MORE], [SETUP], [MORE], [MORE], [MORE], [MORE]. The following menu will be displayed:

SET ANALOG INPUT
[DEFAULTS] [MORE]

If you wish to re-patch all the analog inputs back to a 1:1 patch, press [DEFAULTS]. The following menu will appear:

ARE YOU SURE? IF
SO PRESS [ENTER]

If you are not sure, press any key except [ENTER] to return to the previous menu. If you are sure, press [ENTER], and a brief message of " WRITING DATA ..." will be displayed.

2.5 Factory Defaults Selection:

There are an abundance of functions that are initialized if this selection is made:

- All non-analog presets in memory (Presets 13 through 400) are completely erased.
- Both DMX-512 and Microplex softpatches default to 1:1 at full on channels 1 through 12.
- Luma-Net patch defaults to dimmer 1.
- The dimmer pack is set to 12 channel, 3 phase operation.
- All dimmer curves default to dim operation.
- All dimmer maximum levels are set to Full.
- All dimmer minimum levels are set to 0.
- Line regulation is set to "ON"

If you wish to continue, from the main menu:

**NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]**

Press the key sequence **[MORE]**, **[MORE]**, **[SETUP]**, **[MORE]**, **[MORE]**, **[MORE]**, **[MORE]**, **[MORE]**. The following menu will be displayed:

**SET FACTORY
[DEFAULTS] [MORE]**

If you wish to completely clear all memory other than the analog input patch, press **[DEFAULTS]**. The following menu will appear:

**ARE YOU SURE? IF
SO PRESS [ENTER]**

If you are not sure, press any key except **[ENTER]** to return to the previous menu. If you are sure, press **[ENTER]**, and a message of " **WRITING DATA ...**" will be displayed for several seconds while all permanent memory is re-programmed.

2.6 Luma-Net Start Address

This menu sets the start address for dimmer 1 for Luma-net operation of the dimmer pack. Note that it is not necessary to softpatch any other functions for Luma-Net operation, because the softpatch and levels are stored in the Luma-Net stations themselves. If you wish to change the Luma-Net start address, then from the main menu:

**NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]**

press the key sequence **[MORE]**, **[MORE]**, **[SETUP]**, **[MORE]**, **[MORE]**, **[MORE]**, **[MORE]**, **[MORE]**, **[MORE]**. The following menu will be displayed:

**SET LUMA-NET= 001
[CHANGE] [MORE]**

If you wish to change the Luma-Net start address, press **[CHANGE]**, and then enter the start address you desire. The new address will be stored in permanent EEPROM memory, and will automatically load on power-up.

2.7 Set Line Regulation

This menu enables or disables the line regulation feature of the dimmer pack. Line regulation is a feedback system that monitors the incoming line voltage, and attempts to compensate for surges or sags in the feeder voltage by inversely dimming the output up or down, thereby maintaining a constant output voltage to the lamp. This feature operates best when the incoming feed power voltage is about 125VAC. The dimmer pack then has the head room to keep the lamps operating at their maximum voltage, even if the feed voltage sags or surges a few volts. The DS dimmer pack should never be fed with line voltage above 130VAC, however, especially while operating in the non-regulated mode.

Line regulation can be susceptible to operational problems on very soft or very unstable power feeds. For this reason, the user has the ability to turn off line regulation from this menu. Although this may alleviate most power feed interaction problems, it can not correct for poor installations with extremely soft and /or noisy feeders and neutrals, from which can cause false triggering can occur due to false feeder zero cross information.

To change the line regulation setting, from the main menu:

**NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]**

press the key sequence **[MORE], [MORE], [SETUP], [MORE], [MORE], [MORE], [MORE], [MORE], [MORE], [MORE]**. The following menu will be displayed:

**SET LINE REG = ON
[OFF] [MORE]**

The active line regulation setting will be displayed to the right of the equal sign, with the alternate option displayed for the left soft key function (F1). To toggle the line regulation operation, press the (F1) function key. The new setting will be stored in permanent EEPROM memory, and will automatically load on power-up.

Section 3 SOFTPATCH

The DS dimmer pack has the ability to be patched quickly if only a start address is required and normal full range dimming is required, or it is capable in the custom patch menu of proportionally patching any DMX-512 or Microplex multiplexed control signal to any dimmer, setting custom dimming curves, and setting maximum and minimum control levels. The dimmer pack is factory configured with a 1:1 patch on dimmer channels 1 through 12 for both Microplex and DMX-512 inputs.

3.1 Set DMX-512 Start Address

From the main menu :

**NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]**

Press the [DMX#] keypad. If there is not a custom patch in memory, the following menu will be displayed:

**SET START ADDRESS
DIMR 01 = DMX# 001**

The cursor will be flashing on the most significant DMX# digit. Enter the full DMX# one digit at a time where you want the operation of dimmer 1 to begin. All DMX-512 proportional control levels will automatically default to full.

If there is a custom DMX-512 patch in memory, the option to [ERASE] or [KEEP] the custom patch will be displayed. If [KEEP] is pressed, the control module will return to the main menu. If [ERASE] is pressed, the custom softpatch for DMX-512 will be erased as soon as the start address is entered.

3.2 Set Microplex Start Address

From the main menu :

**NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]**

Press the [MICROPLEX#] keypad. If there is not a custom patch in memory, the following menu will be displayed:

**SET START ADDRESS
DIMR 01 = MPX# 001**

The cursor will be flashing on the most significant MPX# digit. Microplex is capable of handling up to 128 channels. Enter the full MPX# one digit at a time where you want the operation of dimmer 1 to begin. All Microplex proportional control levels will automatically default to full.

If there is a custom Microplex patch in memory, the option to [ERASE] or [KEEP] the custom patch will be displayed. If [KEEP] is pressed, the control module will return to the main menu. If [ERASE] is pressed, the custom softpatch for Microplex will be erased as soon as the start address is entered.

3.3 Custom Softpatch

Please note that all softpatch entries are stored in non-volatile EEPROM, and are automatically loaded on power up. Softpatch modifications take effect immediately. From the main menu :

**NSI DSxx xPHASE
STATUS=xxx [MORE]**

Press the [DIMMER] keypad. The following menu will be displayed:

**DIMMER # = 01
TEMP= xxC [MORE]**

The cursor will be flashing on the most significant dimmer number digit. This menu defaults to dimmer 01. Enter a different dimmer number if you so desire. Note the temperature reading in the bottom left corner of the LCD display. Refer to the feedback section of the manual for normal operating temperature ranges.

3.31 Custom DMX Softpatch

To custom patch DMX-512 channels, press [DMX#]. To custom patch Microplex channels, press [MICROPLEX#], then skip down one paragraph to the Microplex menu. If DMX# is pressed the following menu will appear:

**DIM=01 @ DMX#001
@LEVEL=FL [MORE]**

The cursor will be blinking on the most significant digit of the current DMX# channel where the dimmer is patched. Enter any DMX channel number between 1 and 512, where the dimmer is to be patched. You may also choose to enter a proportional level, where the cursor will automatically jump once the DMX channel has been entered. If you do not wish to enter a proportional level, press [ENTER] .

3.32 Custom Microplex Softpatch

Note that pressing [ENTER] will automatically increment to the next custom patch field, while [CLEAR] will back up to the beginning of the field, and then to the previous selection, and then to the previous menu. The Microplex patch menu will appear:

**DIM=01 @ MPX#001
@LEVEL=FL [MORE]**

The cursor will be blinking on the most significant digit of the current MPX# channel where the dimmer is patched. Enter any MPX channel number between 1 and 128, where the dimmer is to be patched. You may also choose to enter a proportional level, where the cursor will automatically jump once the MPX channel has been entered. If you do not wish to enter a proportional level, press [ENTER].

3.33 Live Dimmer Status

Press [MORE] to display the following status screen:

DIM 01 = xx% DIMR
SOURCE=yyy[MORE]

This screen displays a variety of live functions of the dimmer. This screen not only displays the current control level for the dimmer, but also indicates where the control source level has been derived. Highest takes precedence Control sources can be:

DMX for DMX-512
MPX for Microplex
BMP for Test Switch
PRE for Preset
LUM for Luma-Net
A1 for analog submaster 1 ...
Through
A12 for analog submaster 12

This live dimmer status screen also indicates the current dimmer curve setting as:

DIMR for a modified square law dimming curve, or
MARK X for a Advance MARK X florescent, or
NON-DIM for an unregulated non-dim.

If a maximum level less than FL has been programmed into the maximum level field, a "^" will appear in the upper left corner of the LCD screen.

If a minimum level more than 00 has been programmed into the maximum level field, a "v" will appear in the upper left corner of the LCD screen.

When you are finished viewing all this status information, press [MORE].

3.34 Custom Patch Dimmer Curves

The dimmer curve menu will then be displayed:

DIM 01 = DIMMER
[DIMMER] [MORE]

If the dimmer curve for this dimmer is a normal modified square law dimming curve, then **DIMMER** will appear to the right of the equal sign. If **NONDIM** or **MARK X** is to the right of the equal sign, and you wish to change the dimmer to a normal modified square law dimming curve, then press the [DIMMER] soft key. If **DIMMER** appears to the right of the equal sign, and you wish to change the curve of the dimmer to that of an unregulated **NON-DIM** or **MARK X** dimmable florescent ballast, then press [MORE] until the desired dimming curve appears in the bottom left soft key position.

3.35 Custom Patch Maximum Level

To skip entering a dimmer curve selection, press [ENTER], which will advance the control module to the maximum level selection menu:

DIM 01 MAX LEVEL
= FL% [MORE]

The maximum level selection will keep the dimmer below the specified level for all control inputs, with the exception of a selected **NON-DIM** curve, which is an unregulated **NON-DIM**, and will turn the dimmer on full blast for a control level over 50%. If you wish to change the maximum level, enter a level between **01%** and **FL%**. If you wish to skip the max level menu, press [ENTER].

3.35 Custom Patch Minimum Level

The minimum level menu will follow:

DIM 01 MIN LEVEL
= 00% [MORE]

This level is essentially a warmer level. It can be used to keep filaments hot for quick lamp response, or for emergency circuits that you never want to go off. The **NON-DIM** curve over-rides this setting, however, and forces the dimmer to off if the control source is below 50%. If enter is pressed, the control module returns to the main **DIMMER** menu where a new dimmer channel selection may be entered.

Section 4 Analog Submasters

The 0-10VDC analog inputs on this DS dimmer pack do not have to be just 0-10VDC control inputs for single channel dimmer control. The analog inputs can also operate as overlapping submaster scenes with time fade damping, or trigger inputs to linked presets that can operate in a chase pattern on one of the analog submasters. Please note that the analog scenes are stored in non-volatile EEPROM memory, and they will always automatically load on power up.

4.1 Analog Submaster Snapshot Procedure

Connect any 12 channel 0-10VDC analog output console or control station to the analog inputs. Connect a switch between +14.4VDC and the T/C input.

1. Start with all channels on the analog console off, and the T/C switch open or off.
2. When you wish to snapshot a scene, bring up the scene, live, that you desire to be loaded into the submaster analog channel. Note that at least one channel in the scene must have a level 5% different than the other channels, otherwise the scene will be interpreted by the pack to be a hold time. The scene may be generated from either the DMX-512 control input, or the Microplex control input, or the highest takes precedence levels of both inputs.

Note: In order for the DS pack to enter the snapshot mode, all 12 analog inputs must be off, or below 1/2 volt.

3. With all 12 channels to off on the analog console, close the T/C switch for about 10 seconds. When the pack has entered snapshot mode, the lights will dim 50%. Note that the T/C input may be daisy -chained between packs.
4. While still keeping the T/C switch closed, raise the analog channel to full where this scene is to be loaded.
5. When the scene has loaded, the lights will return to their full intensity, and the T/C switch can be released or opened.
6. To disable snapshot from a remote location, keep the T/C switch open.

4.2 Analog Submaster Fadetime Snapshot Procedure

Connect any 12 channel 0-10VDC analog output console or control station to the analog inputs. Connect a switch between +14.4VDC and the T/C input.

1. Start with all channels on the analog console off, and the T/C switch in the open position.
2. When you are ready to snapshot the fade time, **set all 8 or 12 dimmer channels to same level using the Microplex or DMX-512 control source** corresponding to the following fade out times:

Approximate damping times

FL = 30 seconds
90% = 9 seconds
80% = 8 seconds
70% = 7 seconds
60% = 6 seconds
50% = 5 seconds
40% = 4 seconds
30% = 3 seconds
20% = 2 seconds
10% = 1 second
0% = instantaneous

3. With all 12 channels to set to the same level on the microplex or dmx-512 console, and all 12 analog control inputs to 0%, close the T/C switch for about 10 seconds. When the pack has entered snapshot mode, the lights will dim 50%.
4. While keeping the T/C switch closed, raise the analog input channel to full of the analog channel where this fade time to be loaded.
5. When the fade time has loaded, the lights will return to their full intensity, and the T/C switch can be released or opened.
6. To disable snapshot from a remote location, keep the T/C switch open.

4.3 Analog Submaster Editing

The analog submasters and their associated fade times can also be created or edited from the front panel of the DS dimmer pack itself. The first 12 presets in the [PRESET#] menu correspond to analog submasters 1 through 12. From the main menu :

**NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]**

Press the [PRESET#] keypad. The following menu will be displayed:

**PRESET # = 01
[EDIT] [RUN]**

Type in the analog submaster channel you wish edit (001= analog channel 1,... 012= analog channel 12) then press [EDIT]. If you wish to edit channel 1 just press [EDIT]. If the default analog patch has been enabled, the following menu will be displayed:

**DIMMER=01 AT FL
PRESET=001[MORE]**

This menu allows you to set the control level of each channel individually. If you wish to edit the control level for channel 1, press [ENTER]. If you wish to edit the control level of another channel, enter the dimmer number, or press [ENTER] until the dimmer # you desire appears in the window. Note that [ENTER] steps the menu to the next entry field, or auto increments to the next dimmer channel. [CLEAR] steps back one field or menu, each time it is pressed. When you are finished editing levels, press [MORE]. The following menu will appear:

**ANALOG INPUT
FADE TIME = 0SEC**

From this menu the fade time damping of the analog submaster may be set or edited. Enter any digit 0-9 or FL. The damping times correspond to the following:

Approximate damping times

FL = 30 seconds
90% = 9 seconds
80% = 8 seconds
70% = 7 seconds
60% = 6 seconds
50% = 5 seconds
40% = 4 seconds
30% = 3 seconds
20% = 2 seconds
10% = 1 second
0% = instantaneous

Section 5 Presets

The DS dimmer has the capacity for 400 presets with time fade. The first 12 presets correspond to the analog submasters described in section 5. The remainder of the presets, termed "**deep presets**" are capable of being started manually from the front panel, or triggered by an analog input channel. These 388 deep presets feature 0 to 999.9 second dipless cross fade times, and hold times of between .1 to 999.9 second or forever. These deep presets can also be linked, so that a chase effect can be created. This section has been divided into three sub sections, Editing deep presets, running deep presets, and analog triggered deep presets

5.1 Editing Deep Presets

From the main menu :

NSI DS_{xx} xPHASE
STATUS=_{xxx} [MORE]

Press the [PRESET#] keypad. The following menu will be displayed:

PRESET # = 01
[EDIT] [RUN]

Type in the preset # you wish edit. Note that presets 1 through 12 are analog submaster scenes. For convenience, lets choose Preset# 020. Then press [EDIT]. The following menu will be displayed:

DIMMER=01 AT FL
PRESET=020[MORE]

Edit the dimmer control levels you wish to see in the preset. If you wish to edit the control level for channel 1, press [ENTER]. If you wish to edit the control level of another channel, enter the dimmer number, or press [ENTER] until the dimmer # you desire appears in the window. Note that [ENTER] steps the menu to the next entry field, or auto increments to the next dimmer channel. [CLEAR] steps back one field or menu, each time it is pressed. Note that you cannot change the preset # from this sub menu, although the preset you are editing is displayed in the lower

left corner of the LCD screen. When you are finished editing levels, press [MORE]. The following menu will appear:

FADE TIME = 000.0s
[MORE]

Set the dipless cross fade time that you wish for this preset to fade in. The previous preset will fade out at the same rate. A **000.0**second fade time fades instantaneously. A **999.9**second fade time fades out in 16- 2/3 minutes. Press [MORE] when you are finished. The following menu will be displayed:

HOLD TIME = 000.0s
[MORE]

Please note that an **000.0** second hold time will hold the preset active forever, when run from the front panel menu display. An entry of **000.1**second to **999.9**seconds will hold the preset active for the selected hold time, then will automatically start the next or linked preset crossfade when the hold time runs out. This operates essentially like an auto-follow on a theatrical console, and allows the next cue to be activated automatically. Press **[MORE]** when the hold time has been entered, then the next menu will appear:

LINKtoPRESET=OFF
[MORE]

The link to preset menu tells the control module which preset to load next. If a preset has a hold time greater than zero, and the hold time has just completed its countdown, then the control module will automatically look at the link to preset field to see if there is an entry. If there has been an entry, it will use the **LINK to PRESET** entry as the pointer for which preset to execute next. *IE...* if preset 36 was running and it had a **LINK to PRESET** of 030, then Preset 30 would be the next preset executed. If there is not an entry in the **LINK to PRESET** field, then the display to the right of the equal sign will indicate OFF, and the control module will automatically increment the preset to be executed to the next sequential preset. At preset 400, however, the control module stops incrementing.

If you desire, enter the 3 digit **LINK to PRESET** pointer, of which preset should run next. (13 through 400). When you are finished, press **[CLEAR]** 4 times to take you back to the main preset menu. Using the sequence described in this section, edit all the deep presets you wish. When finished go to the next sub-section, running deep presets.

5.1 Running Deep Presets

From the main menu :

NSI DSxx xPHASE
STATUS=xxx [MORE]

Press the **[PRESET#]** keypad. The following menu will be displayed:

PRESET # = 01
[EDIT] [RUN]

Type in the preset # you wish to run first. Then press **[RUN]**. The following menu will appear:

FADE LEFT = xxx.x
[STOP] #zzz [GO]

The preset you selected should appear in the bottom center of the display. The fade time for the preset you selected will appear on the upper line. Note that the display counts from the time that the cue is executed. Press **[GO]**.

The control module will fade in the scene at the rate you selected. When the fade is complete, the control module will automatically load the hold time for the preset. Note the display change to the following:

HOLD LEFT = xxx.x
[STOP] #zzz [GO]

If there is a 000.0 hold time in the preset, the preset will remain active, and the control module will automatically load the link pointer, or increment to the next preset. It will not fade in the next preset, however, until the **[GO]** soft key is pressed again. **[STOP]** will stop execution of the preset completely, and bring all preset levels to blackout.

If the preset has a hold time of 000.1 to 999.9 seconds, then as soon as the fade time has completed the control module will count down the hold time. When the count down reaches 000.0, then the control module will automatically load the link pointer, or increment to the next preset then it will automatically run that next preset.

5.2 Analog Triggered Deep Presets

This section assumes that you understand how to create and run presets, fade times, and links as described in the previous sections.

If you have been poking around in the edit preset menus, you may have come across a menu after the **LINK to PRESET** menu called **AUTO TRIGGER**. The auto trigger menu enables presets to automatically load into the analog submasters. Here are the rules:

1. Every preset to be auto triggered must have the analog channel # entered into the auto trigger field . If the next linked or incremented preset does not have the auto trigger programmed, then the control module will stop.

Example: If a chase is to be programmed into presets 30 through 42 and the chase is to be activated by analog input 1, then every preset, 30 through 42, must have AUTO TRIGGER = A01 programmed into its preset.

2. Only one auto-triggered preset or group of presets can be active at a time. The control module automatically prioritizes the control levels of analog input channels 1 through 12, and uses the lowest channel number input as the active trigger input.

Example: If a chase programmed into presets 30 through 42 is auto triggered by analog input 1, and another chase is programmed into presets 50 through 55 auto triggered by analog input 2, then the chase on analog input 1 will override the chase on analog input 2, if analog channel 1 has a level over 10%

3. The lowest number auto triggered preset is always the first preset to execute when the analog channel raises from 0 to at least 10%.
4. The auto triggered preset loads into its respective submaster scene, therefore the whole preset scene is under the proportional control of the analog input control level.

When you are sure you understand these features and constraints, select the applicable preset number from the main preset menu, press **[EDIT]**, and then **[MORE]** 4 times, and the following menu will be displayed:

AUTO TRIGGER = OFF
[ON] [MORE]

Press **[ON]**. The LCD menu will change indicting a default trigger channel of analog input 1. Enter the analog trigger channel that you desire. Press **[CLEAR]** to back out of the menu, and then enter the trigger channels for all presets that are to be auto-faded by the trigger input.

The lowest number auto triggered preset will automatically load and run as soon as the associated analog channel is raised from 0% to over 10%.

Section 6 Dimmer Feedback

The DS dimmer has several mechanisms for dimmer feedback. The most readily available feedback is the LED's on the front panel display.

- The green LED above each circuit breaker fades up and down proportional to the corresponding dimmer level.
- The 3 red phase power indicators show that proper power has been applied to the pack, and all 3 power transformers are receiving line power.
- The yellow overtemp indicator illuminates if a dimmer module temperature exceeds 80 degrees C, and it also blinks momentarily when a valid luminet command has been received.
- The green Microplex indicator flashes in a fast, steady fashion if a valid Microplex signal is being received.
- The green DMX indicator flashes in a fast, steady fashion if a valid DMX-512 signal is being received.

The lower line of the main menu displays a status menu that indicates a number of error conditions, like power input over or under voltage, over-temperature status, configuration memory errors, and thermistor connection errors. It is normal for some of these error indications to display briefly during power up, but after a few seconds, STATUS should display "OK" If any of these errors occur consistently or permanently, please refer to section 8.

If the thermistor connection is broken between the control module and the dimmer module, or in the dimmer module itself, the following message will be displayed on the bottom line of the main menu:

"**THERM 1&2**" -- if the thermistor connection for dimmers 1 & 2 is broken.
"**THERM 3&4**" -- if the thermistor connection for dimmers 3 & 4 is broken.
"**THERM 5&6**" -- if the thermistor connection for dimmers 5 & 6 is broken.
"**THERM 7&8**" -- if the thermistor connection for dimmers 7 & 8 is broken.
"**THERM 9&10**" -- if the thermistor connection for dimmers 9 & 10 is broken.
"**THERM 11&12**" -- if the thermistor connection for dimmers 11 & 12 is broken.

Note: The dimmers in the affected dimmer module cannot turn on until the thermistor connection problem is rectified. Refer to section 8 of the manual for assistance.

Individual dimmer status can also be monitored. From the main menu :

NSI DSxx xPHASE
STATUS=xxx [MORE]

Press the [**DIMMER**] keypad. The following menu will be displayed:

DIMMER # = 01
TEMP= xxC [MORE]

Note the temperature reading in the bottom left corner of the LCD display. This is the operational temperature of the dimmer module of the selected dimmer. The temperature display has a resolution of 1degree C. The operational temperature range of the DS dimmer module is 0 to 85 degrees C. The dimmer module will go into an over-temp warning condition at 85 degrees C, and will linearly dim to off by 90 degrees C.

Press [**MORE**] to display the following status screen:

DIM 01 = xx% DIMR
SOURCE=yyy[MORE]

This screen displays a variety of live functions of the dimmer. This screen not only displays the current control level for the dimmer, but also indicates where the control source level has been derived. Highest takes precedence Control sources can be:

DMX for DMX-512
MPX for Microlpex
BMP for Test Switch
PRE for Preset
LUM for Luma-Net
A1 for analog submaster 1 ...
Through
A12 for analog submaster 12

This live dimmer status screen also indicates the current dimmer curve setting as:

DIMR for a modified square law dimming curve, or
MARK X for a Advance MARK X florescent, or
NON-DIM for an unregulated non-dim.

If a maximum level less than FL has been programmed into the maximum level field, a "^" will appear in the upper left corner of the LCD screen.

If a minimum level more than 00 has been programmed into the maximum level field, a "v" will appear in the upper left corner of the LCD screen.

Section 7 Control Module Jumper Settings

It is highly unlikely that a user would ever want to change the jumper settings in the control module, however, here is a listing of their settings and their function. The jumpers are located on the bottom of the control module, towards the center of the Processor PCB.

- JP2 Jumper Installed =** Transformer control voltage scaled for 120VAC. This also assumes all 3 Transformers are strapped for 120VAC, and 120VAC dimmer modules are installed.
- Jumper Removed =** Transformer control voltage scaled for 240VAC. This also assumes all 3 Transformers are strapped for 240VAC, and 240VAC dimmer modules are installed.
- JP3 Jumper Installed =** Slow Line Regulation Algorithm active. This algorithm is recommended for moderate line power feeds. (minor surges and sags in the feed). The algorithm will also operate well on hard power feeds.
[Factory Default]
- Jumper Removed =** Fast Line Regulation Algorithm active. This algorithm is recommended for hard line power feeds.
- Note: For soft power feeds , line regulation should be turned off. Soft power feeds are usually associated with significant surges or sags in line voltage, and or soft neutral connections. Refer to section 2.7.
- JP5 Jumper Installed =** Normal Luma-Net control data rate (7.812K BAUD) for Lumanet Control Stations.
[Factory Default]
- Jumper Removed =** High speed Luma-Net data rate (38.4K BAUD). High speed data control stations are not yet available (as of 8/99).

Section 8 **NSI Corporation Limited Warranty**

NSI Corporation warrants new electronics products to be free from defective materials and workmanship for a period of one (1) year from the date of purchase to the original owner when purchased from an authorized NSI dealer. The purchaser is responsible for completing and mailing to NSI, within 15 days of purchase, the warranty registration card enclosed with each product. NSI products that have been subject to accident, alteration, abuse, or defacing of the serial number are not covered by this warranty. The normal wear and tear of items such as knobs, jacks, and switches are not covered under this warranty.

If your NSI product requires service during the warranty period, NSI will repair or replace, at its option, defective materials provided you have identified yourself as the original owner of the product to NSI or any authorized NSI dealer. Transportation charges to and from an authorized dealer or the NSI factory for repair shall be the responsibility of the owner. All products returned to NSI must have factory authorization for return prior to shipping.

NSI Corporation is not liable for any incidental or consequential damages resulting from defect or failure other than repairs of the NSI product subject to the terms of this warranty. This warranty gives you specific legal rights, and you may have other rights which vary from state to state. This warranty is expressly in lieu of all other agreements and warranties expressed or implied except as may be otherwise required by law.