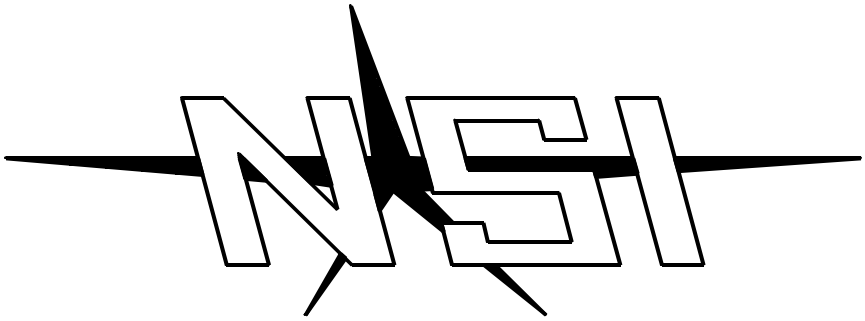

TLC 16

MEMORY LIGHTING CONTROLLER

Software Revision 1.00 version A and above

OPERATION MANUAL

TLC 16

MEMORY LIGHTING CONTROLLER

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Software Revision 1.00 version A and above

Document Revised: 3/14/95

NSI CORPORATION

Wilsonville, OR

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1 Introduction

Welcome

You are entering a new era of microprocessor controlled stage lighting technology. The powerful NSI Micro-Plex designs involve the electrical marriage of microprocessor technology and digitally controlled multiplexing. The result is a control package with the flexibility for a variety of innovative applications.

The NSI TLC 16 Lighting Console features an advanced microprocessor based design containing many benefits found in today's personal computers. This technology provides for adding programmable Memory Scenes and Chase effects to the simplicity of a touch panel console.

The NSI Micro-Plex technology found in all NSI products allows components of your lighting system to be interconnected by way of standard 3-conductor microphone cables or audio snakes. Up to 128 individual control signals may be transmitted to dimmer packs through a single microphone cable and the returned phantom power eliminates the need for AC power cords on NSI controllers. This makes the remote placement of the TLC 16 Lighting Console easy and convenient.

The NSI TLC 16 Lighting Console represents our continuing commitment of leading the industry in defining technological advances for stage lighting.

Welcome to the era of microprocessor controlled stage lighting!

2 Installation\Setup

Power Supply Requirements

The TLC 16 Lighting Console requires a source of 15 volts DC (at least 250 MA) to operate satisfactorily. When used with NSI dimming equipment, power is provided through the Micro-Plex microphone cord connection system when connected to the dimmers.

If the console is equipped with the DMX-512 output and used with DMX-512 controlled dimmers or if the microphone cable length exceeds 100 feet, the external power supply jack can be used to apply power to the console. Use the optional power supply available from the factory (OPT-00015-0) or call your dealer for assistance in obtaining a proper supply. **Make sure that the plug on any power supply not supplied through NSI is configured so that the center connector is positive.**

Dimmer Equipment Connection

Connecting the TLC 16 Lighting Console to NSI dimming equipment is very simple. You need only connect a single 3 conductor audio cable (standard microphone cable equipped with a 3-pin XLR type connector) to either of the jacks marked MICRO-PLEX on the rear apron of the console. It doesn't matter which jack is used, two jacks are provided for convenience. Connect the other end of the cable to the NSI dimming equipment.

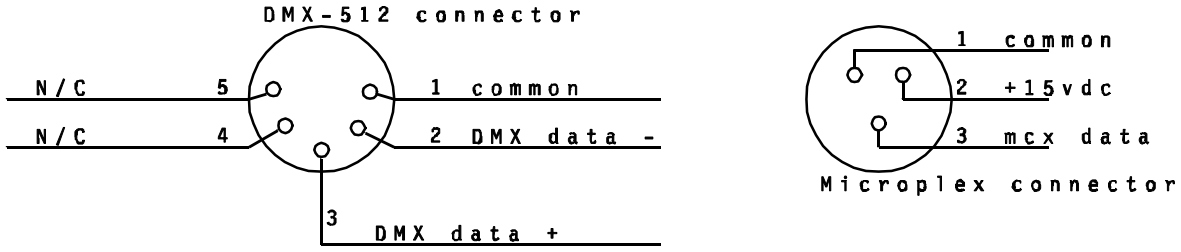

Fig. 1 Dimmer Output Connectors

The console is also equipped with a DMX-512 output. Connection to the dimming equipment can be provided through the 5 pin XLR type connector located on the rear apron of the console. This connector adheres to the USITT standard on DMX-512 and will support the 16 dimmer channels with one 3 wire cable. Since remote power is not provided on this connector, an optional power supply (OPT-00015-0) must be used when DMX is used as the only output signal.

3 Overview

Front Panel

1. *Channel Levels* — These 16 LED's show the current intensity of each of the console control channels.
2. *Channel Latch Pads* — These 16 pads are used to control and/or program channels 1 - 16.

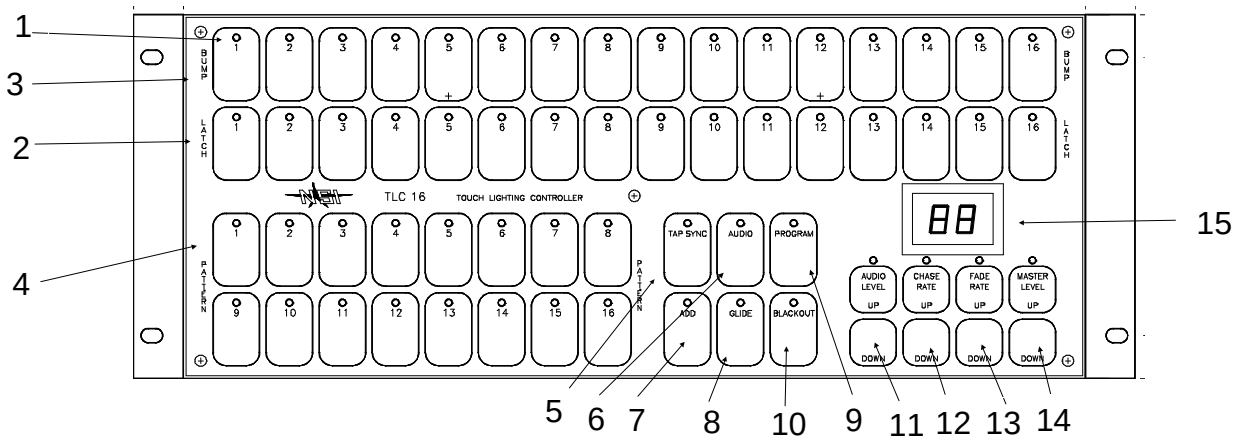

Fig. 2 Front Panel TLC 16

3. *Channel Bump Pads* — These 16 pads are used to bring an individual channel, to full intensity. They also are used for quick pattern programming.
4. *Pattern Pads* — The 16 Pattern Select pads are used for activating any of the 16 patterns stored in memory.
5. *Tap Sync* — Repeatedly tapping this pad establishes the chase rate.
6. *Audio* — Activates audio sync of chase rate and audio intensity effects.
7. *Add* — Changes the mode of the Pattern pads to ''add'' instead of ''kill''.
8. *Glide* — Causes patterns activated after Glide is turned on to fade or ''glide'' between steps.
9. *Program* — Activates Program mode for programming of patterns and audio intensity.
10. *Blackout* — Each tap will clear functions in the following order: Latches then Patterns. Press and hold will bypass fading.
11. *Audio Level* — These pads control the sensitivity of the audio automatic gain control circuit. Adjust for best effect with audio. The setting is displayed as a relative number from 0 (least sensitive) to FL (most sensitive).
12. *Chase Rate* — These pads control the speed at which the patterns sequence (chase).The setting is displayed as a relative number from 0 (stopped) to FL (fastest).
13. *Fade Rate* — These pads set the initial fade in and out of patterns and other functions. The setting is displayed as a relative number from 0 (fastest) to FL (slowest).
14. *Master Level* — These pads set the maximum level to stage. It does not affect the Channel level LEDs. The setting is displayed as a relative number from 0 (minimum) to FL (maximum).
15. *Display* — This display indicates the current level setting of the Audio, Chase Rate, Fade Rate, and Master Level pads. The first tap of the pad will cause the LED above the pad to light, indicating that the display is showing the respective current level and any changes.

Rear Panel

1. *Micro-Plex Outputs* These 2 outputs provide NSI's microphone dimmer connection via a 3 pin XLR type connector. Either connector may be used (1-Male, 1-Female).

2. *DMX-512* This output is used to provide dimmer control information to dimmers using this protocol. Its 5 pin Female XLR connector conforms to the USITT standard.

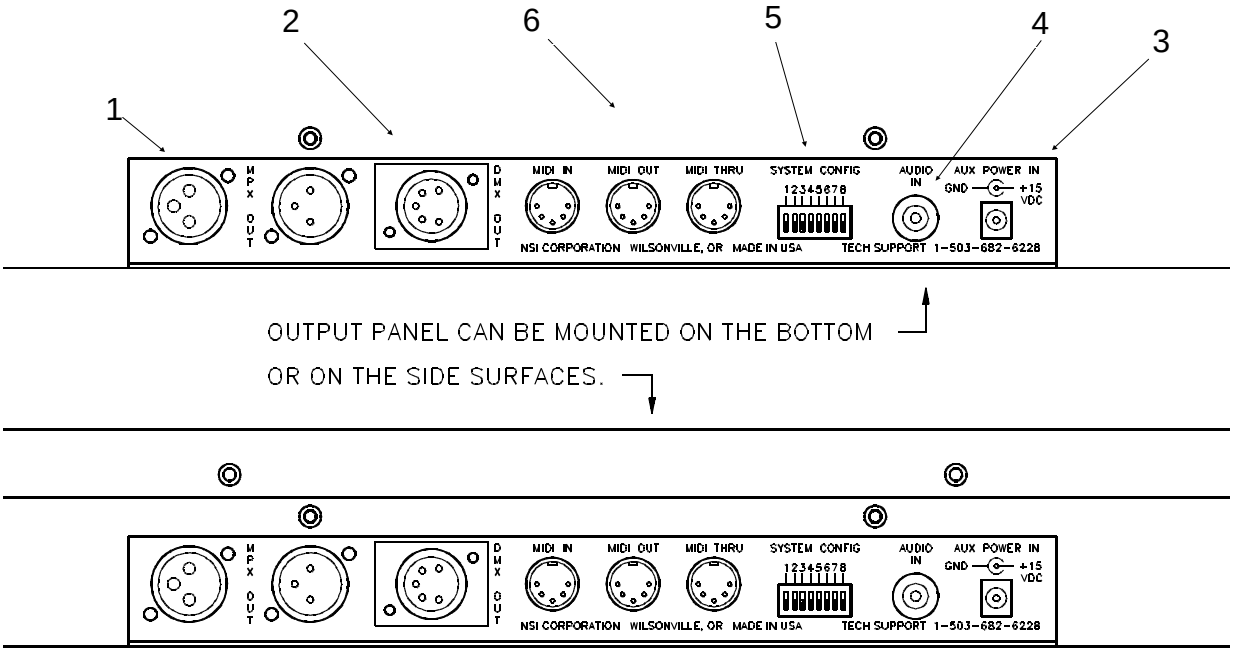

Fig. 3 Rear Panel TLC 16

3. *AUX DC Power* This input jack allows a standard wall transformer rated at 15v DC (at least 250 MA) to provide power to the TLC 16 console.

4. *Audio Input* This jack accepts a line level audio input signal to synchronize chase and provide audio intensity effects.

5. *Configuration Dip Switch* These switches allow customization of some console functions.

6. *MIDI In/Out/Thru* MIDI ports for connection to a sequencer or MIDI storage device.

4 Operation Guide

General

The TLC 16 Lighting Console consists of a manual 16 channel latch and bump pads, and 16 programmable memories that can be static scenes or chase patterns. The console is designed to allow tailoring to your needs.

To give the user channel intensity feedback, channel intensity LED's are provided above each of the channel bump pads. These LED's show relative intensities from all console functions and are not affected by the Master control.

Configuration

The TLC 16 has several features that can be customized to your applications. If changes are desired, please see the section on Console Configuration.

IMPORTANT: If this is the first time you will be using the console or if you experience any problems such as dimmers not responding or other unusual operation, the configuration may have been accidentally changed. See section on Console Configuration.

Bump pads

Above the channel latch pads are 16 momentary bump pads. These pads are used to bump each individual channel to full intensity regardless of the Blackout pad or the setting of the Master control.

Note: In Programming mode, the bump pads serve a special function and will not affect stage lighting.

Latch pads

Below the channel bump pads are 16 toggle Latch pads. These pads are used to latch each individual channel to full intensity. These pads are cleared by the Blackout Pad.

Note: In Programming mode, the bump pads serve a special function and will not affect stage lighting.

Pattern Select pads

The 16 Pattern Select pads are used for activating any of the 16 static scenes or chase patterns stored in memory. A tap of any of the Pattern Select pads will light the LED above the pad and cause the pattern or scene stored in memory to fade in at the set fade rate. A second tap of the pad will cause the LED to go off and the pattern or scene will fade out at the set fade rate.

Touching and holding down any of the Pattern Select pads will bypass the set fade rate and cause all patterns or scenes to fade in or out instantly (after a short delay).

Pattern Select pads operate normally in the ''kill'' mode, whereas touching one pad will ''kill'' other patterns that are active and cause them to fade out while the selected pattern fades in. If the pad is held down then the fades are instant.

Touching the Add pad will put the patterns in the ''add'' mode and all patterns will operate independently of each other.

The console may be configured such that the top row of patterns (1-8) may be locked into the ''add'' mode. See section on Configuration.

Tap Sync pad

The Tap Sync pad is used to set and synchronize the chase rate (the rate at which all patterns will sequence) by tapping the pad several times. The chase rate will synchronize to the time of the last two taps. The LED above the Tap Sync pad will flash at the new chase rate. The chase rate may be set anytime whether or not a pattern is running. Tap Sync will override any previous setting of the chase rate control pads until the pads are touched again.

The Tap Sync button can also be used as a manual sequence button by changing it's configuration with the configuation DIP switch (see Console Configuration).

Chase Rate Pads

The Chase Rate pads adjust the chase rate (the rate at which all patterns will sequence). The rate is indicated by the red LED located directly above the Tap Sync pad and by the display whenever the LED above the pads is lit. Tapping or touching and holding one of the pads will cause the rate to increase or decrease. To disable chasing decrease the Chase Rate until the display reads zero.

Fade Rate Pads

The TLC 16 has an autofader to provide automatic crossfades from one pattern or scene to another. The Fade Rate pads determine the speed at which the fade will occur. The relative fade rate is indicated by the display in a number from 0 - 100 (100 is indicated as FL) whenever the LED above the pads is lit. The fade will happen instantly when this the display shows zero and causes increasingly slower fades as the number is raised. Fade rate is overridden by touching and holding most functions.

Glide pad

The Glide pad is used to turn on and off the Glide mode. Any pattern selected after the Glide mode is turned on will fade or ''glide'' between chase steps instead of instantly changing. The rate of the change is determined by the time between steps (chase rate).

The Glide mode is activated by tapping the Glide pad until the Glide LED lights. The Glide mode is turned off by again tapping the pad. Turning on or off the Glide mode will not affect patterns that are already running.

Audio pad and Pads

Audio chase sync may be activated by tapping the Audio pad until the LED above it lights and then by adjusting the sensitivity control pads for desired effectiveness. The relative audio sensitivity is indicated by the display in a number from 0 - 100 (100 is indicated as FL) whenever the LED above the pads is lit.

The patterns will sequence on the audio beat (if discernible) in conjunction with the Tap Sync or Chase Rate. If a chase rate is set, then the chase will resynchronize at each audio beat. If audio alone is desired, set the Chase Rate all the way down to zero to disable. Touching the Audio pad a second time will disable the Audio mode.

Audio intensity effects may be programmed into any channel by using the Program pad. This will cause desired channels to flash to audio whenever the Audio mode is on. See the section on PROGRAMMING CONTROL FUNCTIONS.

Add pad

The Add pad changes the mode of the Pattern pads. Normally the Pattern pads are in a ''kill'' mode, whereas touching any Pattern pad will ''kill'' other active Pattern pads. This way only one pattern is on at a time.

The Add mode is activated by touching the Add pad and illuminating the LED above it. When active, Pattern pads will not ''kill'' other patterns allowing multiple patterns to be on at a time. Touching the Pattern pads a second time will deactivate them.

Blackout pad

Each tap of the Blackout pad will cause functions to deactivate or ‘‘clear’’ in the following order.

1. Latches.

2. Patterns.

It may require up to two taps of the Blackout pad to entirely clear all functions.

The Blackout Led will light when and all Latch pads have been deactivated.

Lights affected by each function will fade out at the set fade rate.

Touching and holding down the Blackout pad will bypass the set fade rate and cause the selected functions to fade out instantly.

Master Level Pads

The Master control provides proportional level control over all console functions to stage with the exception of the Bump pads. For example:

Whenever the Master is at minimum all stage outputs will be at zero except for any resulting from a Bump pad.

If the Master is at 50% all stage outputs will be at only 50% of their current console settings except for any resulting from a Bump pad.

If the Master is at full all stage outputs will follow the console settings.

The Master level is indicated by the display in a number from 0 - 100 percent (100 is indicated as FL) whenever the LED above the pads is lit.

Program pad

The Program pad is used to program chase patterns or static scenes into the pattern memory or to program audio intensity effects. For programming details see the next section on PROGRAMMING.

5 Programming Control Functions

Patterns

Up to 16 Patterns may be stored in the memory of the TLC 16 and may be recalled at the touch of a pad. A Pattern may be either a single scene (static scene) or a sequence of scenes (chase). All programming is stored in non-volatile memory which retains information for at least 10 years, even when power is removed.

Quick Programming Chase Patterns

A chase pattern consisting of steps in which the lights are either fully on or fully off may be programmed very quickly for any of the Pattern pads. The Bump pads are used to create the chase steps. Follow these steps to quick program a chase:

1. Tap the Program pad until the LED above it lights. If the LED does not light, the memory lock is on (see Console Configurations)..
2. Select the pattern to program by tapping one of the 16 Pattern Select pads causing the LED above the pad to flash. This will erase the current memory programming for this pad.
3. Touch and hold the desired Bump pads(s) for this step of the chase. The levels will not appear on the stage but will be displayed on the channel level LEDs.
4. Releasing all the bump pads will automatically program this step into memory. Repeat step 3 until the desired number of steps is programmed.
5. Tap the Blackout pad to exit from the programming mode.

Programming Chase Using Latches.

Static scenes or Chase sequences involving more channels and complexity may be programmed into any of the Pattern Select pads using the Latch Pads..

Follow these steps to program patterns using the Latch Pads:

1. Tap the Program pad until the LED above it lights. If the LED does not light, the memory lock is on.
2. Select the pattern to program by tapping one of the 16 Pattern Select pads causing the LED above the pad to flash. This will erase the current memory programming for this pad.
3. Select the channels to be ON using the latch pads.
4. Tap the Program pad to program this step into memory.
5. If programming a static scene, tap the Blackout pad now to exit the programming mode.

   If programming a chase pattern, repeat steps 3 and 4 until the desired number of steps is programmed. Tap the Blackout pad when done to exit the programming mode.

NOTE: If the Program LED extinguishes before the blackout pad is tapped, the memory is full.

Audio Sync

An audio signal may be supplied to the TLC 16 console via the phono jack located on the back of the unit. The audio signal can be used to synchronize the chases to the beat of the audio and to affect the intensity of predetermined channels.

Synchronizing Chase Patterns

To synchronize chases; activate the audio mode by tapping the Audio pad until the LED above it lights. Now activate a chase pattern and move the Chase Rate control to the minimum position. Move the Audio Sensitivity slide control slowly up until the desired effect is achieved.

Programming Audio Intensity Effects

The Audio mode may be programmed to flash desired channels to the intensity of the audio signal whenever the Audio mode is on by following these steps:

1. Tap the Program pad until the LED above it lights. If the LED does not light, the memory lock is on.
2. Select channels to be affected by selecting the Latch Pads to light the respective channel level LED, and set the rest of the latches to off.
3. Tap the Audio pad to program the audio flash effects into memory.

Master Controls

Each of the master controls, Audio Level, Chase Rate, Fade Rate and Master Level, can be programmed to come up at preprogrammed level upon power up. To program a control, follow these steps:

1. Set the control to its desired level.
2. Tap the program pad until its LED is lit.
3. Touch both the up and down pads of the control. The program LED should go out and the level is now programmed.

6 Console Configuration

Rear Panel Dipswitch

The 8 Dipswitches on the rear panel serve special functions as follows:

Factory default is all switches off (up):

#1	MEMORY LOCK:	OFF (up) = Unlocked ON (down) = Locked
#2	MICROPLEX MODE:	OFF (up) = Normal ON (down) = Special
#3	CONFIGURE TAP PAD:	OFF (up) = Tap Sync ON (down) = Manual step chase
#4	CONFIGURE LOCK:	OFF (up) = Unlocked ON (down) = Locked
#5	PATTERN 1-8 ADD MODE:	OFF (up) = Normal ON (down) = Always ADD mode
#6	RESERVED:	
#7	RESERVED:	
#8	RESERVED:	

Memory Lock

The entire memory of the TLC 16 can be physically locked to prevent accidental changes to the programmed patterns or scenes. This is highly recommended whenever the console is not expected to be reprogrammed for a period of time.

If programming is attempted on a locked console, the Program LED will not light upon tapping the Program pad.

TO LOCK MEMORY:	Place Dipswitch #1 in the ON (down) position.
TO UNLOCK MEMORY:	Place Dipswitch #1 in the OFF (up) position.

MIDI Settings

To change MIDI settings follow these steps:

1. Place both dipswitch #1 and #4 in the OFF (up) positions.
2. Hold scene select pads 13-16 down at the same time while applying power to the unit
3. Select MIDI setting desired by touching the appropriate Pattern Select pad as listed below and follow instructions. The currently defined setting will be indicated on the channel level LEDs.

Pattern #1: MIDI SEND CHANNEL Pattern #2: MIDI RCV. CHANNEL

After pattern #1 or #2 is touched, the current MIDI channel is displayed by lighting the corresponding channel level LED. To change channel, tap the Bump pad of the corresponding channel. When done, tap the Blackout pad followed by another Pattern Select for additional settings or tap Blackout again to exit MIDI Setting Mode.

Pattern #3: MIDI MEMORY DUMP

Touching pad #3 prepares the console for a Memory Dump to a MIDI disk or any other MIDI storage unit. The dump is approximately 16K bytes. To initiate, touch Pattern #3 pad again. When the transfer is complete, the pattern select LED will flash. At this touch the Blackout pad to leave the MIDI Setting Mode.

MIDI Implementation

The TLC 16 will send and receive MIDI program changes according to the following table:

PROG CHNG NUMBER	FUNCTION
0 - 15	Turn on patterns 1-16
16 - 31	Turn off patterns 1-16
97	Blackout
113	Glide off
114	Glide on
123	Step Change
124	Manual On
125	Manual Off

Note On / Note Off

The TLC 16 will transmit and receive Note On and Note Off data via the bump pads. Velocity is transformed into channel intensity and note numbers correspond to the following lighting channels.

NOTE NUMBER	CHANNEL
96 - 111	1 - 16

Control Changes

Control change #1 is sent whenever a Pattern, Manual, or Blackout pad is touched. The current fade rate is sent as a value of the control change. When receiving a control change #1, the current setting of the fade rate pad is overridden until the pad is moved.

System Exclusive

A System Exclusive Message is sent as a memory dump. Upon receiving the Sys Ex, the console will erase and reload memory automatically.

7 Specifications

Console Specifications

Control Channels	16
Dimmers	16
Patterns (memory)	16
Maximum Steps	approx. 400 total
Memory	Non-volatile EEPROM
	(approx. 10 year retention)
Dimmer Outputs	NSI Micro-plex
	DMX-512
Input Power	15 volts DC, minimum 250ma.
Dimensions (HxWxD)	(2 3/4" x 17 1/8" x 7")
Weight (approx.)	7.0 lbs

8 Trouble Shooting

Checklist

Tap Sync does not sychronize chase	• Configuration set wrong, see section on Console Configuration.
Fade rate intermittent.	• Holding down some pads will override faderate and cause an instant fade.

NSI Technical Services (503) 682-6228

9 Warranty

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.