Film-Tech

The information contained in this Adobe Acrobat pdf file is provided at your own risk and good judgment.

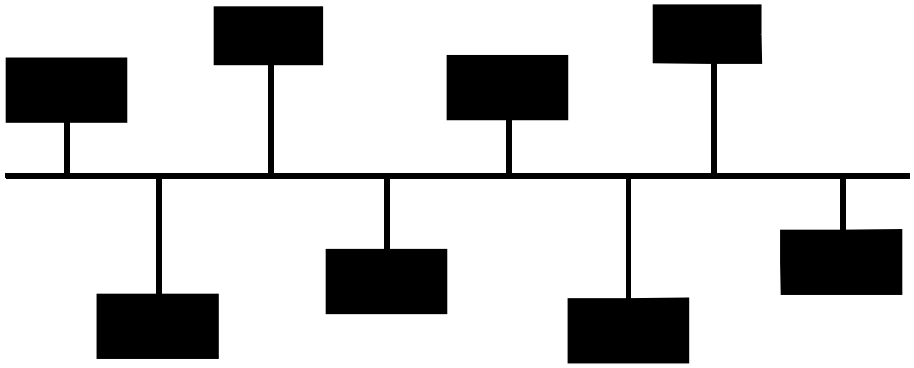
These manuals are designed to facilitate the exchange of information related to cinema projection and film handling, with no warranties nor obligations from the authors, for qualified field service engineers.

If you are not a qualified technician, please make no adjustments to anything you may read about in these Adobe manual downloads.

www.film-tech.com

CINENET™

CNA-150 Cinema Network Automation



Operation and Installation Reference Manual

STRONG INTERNATIONAL

BALLANTYNE OF OMAHA

Revision 1-1
June 1999

WARRANTY INFORMATION

The CNA-150 Cinema Network Automation, sold by STRONG INTERNATIONAL, is warranted against defects in materials and workmanship for one year from the date of purchase. There are no other express or implied warranties and no warranty of merchantability or fitness for a particular purpose.

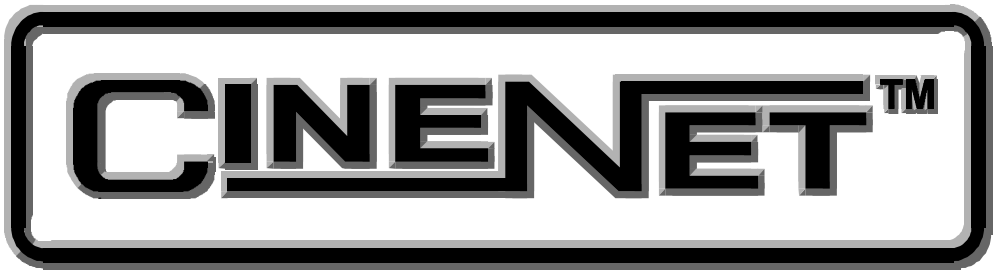
During the warranty period, STRONG INTERNATIONAL will repair or, at its option, replace components that prove to be defective, provided the unit is shipped prepaid to the manufacturer directly or via an authorized distributor. Not covered by this warranty are defects caused by modification, misuse or accidents and any further damage caused by inadequate packing for service return.

STRONG INTERNATIONAL's obligation is restricted to the repair or replacement of defective parts and under no circumstances will STRONG INTERNATIONAL be liable for any other damage, either direct or consequential.

An Introduction to

THE CINENET™ SYSTEM

Strong International's CINENET™ is an automation and control network designed specifically for the Motion Picture Theatre Industry. CINENET™ provides a low cost connection to various control and I/O devices in the projection booth, auditorium, and throughout the theatre complex. CINENET™ is divided into two network layers: The Local Synchronous Network (LSN) is a complex-wide data network that provides advanced synchronous projector control, user selected data transfer and real-time remote automation status. The Local I/O Network (LIN) is designed to provide remote I/O control for each screen in a complex. The CINENET™ network offers many advantages over point-to-point wiring such as reduced installation costs, reduced wiring errors and high noise immunity. CINENET™ also allows management to program and access real-time status of all auditoriums in the theatre complex from a central location using a personal computer. Strong will continue to develop new CINENET™ products that will provide the control and flexibility the theatre industry demands.



Section 1
SYSTEM OVERVIEW

The CNA-150® Cinema Network Automation is a CINENET™ compatible automation system specifically designed for the Motion Picture Theatre industry. The system is modular in design, consisting of the operator interface and system peripherals. The Main Computer and each peripheral device is defined by its common functions and locations in the booth. The devices within the system communicate with each other on a serial communications link. Automation systems and remote stations distributed throughout the booth and other areas of the multiplex communicate on a second serial communications link.

The CNA-150 operator interface is user-friendly and intuitive. Once some basic rules are learned you will be programming and running basic programs in less than an hour.

To enhance the operation of the CNA-150 and provide a higher level of control, the CINENET™ Gateway PC Card and Host software is available. This product will provide a PC interface to the CNA-150 automations. The Host PC and software will allow management to access programming, data logging and diagnostic information from all systems connected to the network. Access to data and system upgrade software will also be available via the modem/Internet.

This manual provides the installer and user with the necessary information to install, setup and operate the CNA-150 automation system. The installer is encouraged to read all sections of the manual before proceeding with the installation. If while installing or operating the CNA-150 automation you find any part of the manual to be unclear or incorrect, please let us know. Call STRONG INTERNATIONAL at (800)-424-1215 if help or additional information is required.

Product Description

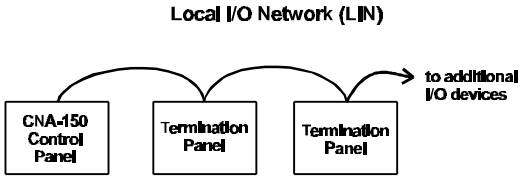
The CNA-150 Cinema Network Automation System is a microprocessor based computer automation designed to automate all aspects of the theatre presentation. The Automation Network is briefly described below.

Local I/O Network (LIN)

Each system component is connected to the network and communicates via a five wire (data+, data-, power, ground, and shield) cable. This cable provides the serial data and power to the termination panels. This is called the "Local I/O Network"or “LIN”. The standard devices that make up the system are the:

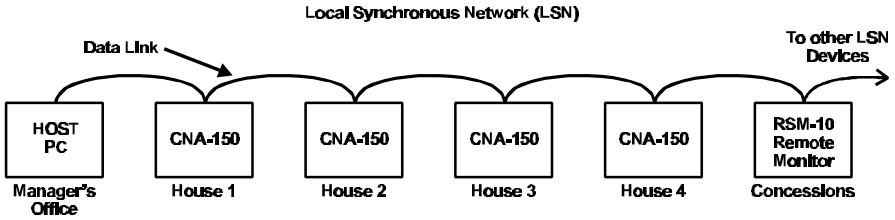
1. Termination Panel(s)
2. CNA-150 Control Panel

The CNA-150 Automation Control Panel contains the Main or Master Computer of the system and each I/O device is connected to it via a serial communications link. The devices are connected in a “daisy-chain” method and can then be distributed within the booth according to their logical location.



Local Synchronous Network (LSN)

The "Local Synchronous Network" is a three-wire (data+, data-, and shield) data link that will support CNA-150, CNA-100 and CNA-200 Automations, remote stations, synchronous communications for interlock, network copy functions and a Host PC. The automation systems are connected together in a “daisy-chain” configuration, which allows the transmission line to continue from one unit to the next.



System Components

The standard components that make up the automation system are described in the following sections.

Control Panel (Operator Interface)

The automation controller and front panel interface is a standard 19" rack mount cabinet. The cabinet can be mounted in all Strong Console systems. The unit will house the main CPU, the front panel interface and the power supply for local and remote power for the Local I/O Network.

Communications to the local I/O devices and other remote CNA-150 systems is accomplished via two serial ports on the Main CPU:

The Local I/O Network (LIN) Com Port - This is the interface for the Local I/O Network that will support the Main I/O Interface, the Console and Booth Termination Panels and other auxiliary devices.

The Local Synchronous Network (LSN) Com port - This is the interface for the Interlock and Copy function between CNA-150 systems, Remote Monitors and PC Host.

The front panel is used to setup, program and run the shows. It also displays error and status messages to the user. The front panel incorporates nine manual override switches used for emergency manual control. These are rocker type switches and their general functions should be obvious to the operator. All manual controls circumvent the electronic circuitry giving the user the ability to control the major functions in the event of an automation failure. The manual control functions are listed below:

1. PROJECTOR - Maintained ON/AUTO
2. LAMP - Maintained
3. CHANGEOVER - Momentary OPEN/CLOSE
4. LENS & MASKING - Momentary FLAT/SCOPE
5. LENS & MASKING - Momentary SPECIAL
6. CURTAIN - Momentary OPEN/CLOSE
7. HOUSE LIGHTS - Momentary UP/DOWN
8. STAGE LIGHTS - Momentary UP/DOWN
9. AUXILIARY - Momentary ON1/ON2

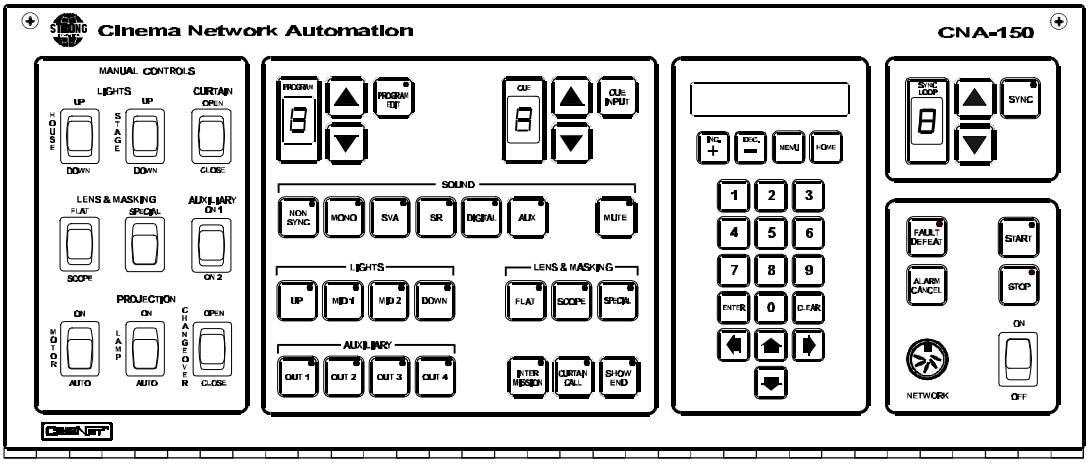


Figure 1.1

Program Number

Displays the program number to run or edit. Use the up and down cursor keys to select the program number. Up to nine unique programs can be saved.

Cue Number

Displays the show cue number. During programming use the up and down cursor keys to select the cue number to edit. Up to nine cues can be programmed for a show.

Programming Keys

These keys are used to program the sound, lens, masking, lights, intermission, curtain call and end of show. LEDs are on each key. The LED is "on" indicating the present state of the output during a show.

Program Edit Key

This key is used to enter the program edit mode allowing the user to build new or alter existing programs. The LED is on when "program edit" is active. The user may edit any program during a show or between shows.

Start Key

This key is used to start or restart a show. The LED on the start key will "blink" when the show is *ready to start* or *ready to restart*. The LED is "on" when the show is running, and "off" when the show is stopped.

Stop Key

This key is used to stop a show. The LED on the stop switch is "on" when a show is stopped, due either to a "local" or "remote" stop input or a fault.

Sync Key

This key is used to activate the automation for synchronous (interlock) operation. The sync LED will be "on" indicating the automation is in sync mode.

Sync Loop Number

This displays the Sync Loop number. Use the up and down cursor keys to change the loop number. Up to 9 different loops can be on the sync network. 0 disables the machine from sync operation. The user is prevented from changing the Sync Loop number when sync is enabled with the Sync Key.

Power Switch

Supplies power to the automation main controller and termination panels.

Fault Defeat Key

This key will defeat or bypass the fault inputs (film presence, film motion and xenon lamp). This key is normally used for testing the projection equipment or newly edited programs. It is *not* recommended for normal operation. The LED will "blink" when the Fault Defeat is activated.

Alarm Cancel Key

This key will cancel the local alarm and all remote alarms. This key is also used to clear any of the latched faults. Pressing the Alarm Cancel key once will cancel the alarm. Pressing the key again will clear the fault condition.

Cue Input Key

This key provides a manual cue input. This is similar to the cue input from the electronic cue detector or pick off. This key is always active during a show.

Numeric Keypad and Display

The keys and display are used to setup system parameters and view diagnostic and run-time status. The display also indicates local and remote faults.

Termination Panels

The CNA Control Panel currently supports two types of termination systems. The type used depends on the specific requirements of the projection booth designers.

The **Dual** termination system consist of two panels that support all standard console and booth equipment control I/O. The functions are logically divided between the two boards according to the location of the projection booth equipment. The *Console* termination panel controls the equipment that is normally associated with the console system such as the projector, lamp, film monitoring, etc. The *Booth* termination panel controls other functions such as masking, curtains and lights. The Dual termination system is flexible in that it allows the Booth termination panel to be located in a place other than the console.

The **Single** termination system combines most of the functions of the Console and Booth Panels into a single panel. This panel provides an option of a single lower cost board for installations that do not need the functions on separate boards.

Dual Termination Panels

Console Termination Panel

This panel supports the input and output termination interface and provides connections for standard booth functions as listed below:

Outputs:

- Projector Motor; On/Off
- Xenon Lamp; On/Off
- Changeover; Open/Close

- Lens Turret; Flat/Scope/Special
- Slide Projector; On/Off

Inputs:

- Film Presence
- Film Motion
- Film Tension
- Cue Input
- Xenon Fault

Features:

- High power *dry* relay contact outputs.
- High power override connector for plug-in cable to override switches.
- Projector motor fuse.
- Plug-in I/O CPU Control Board to handle I/O and serial interface.
- Terminal Blocks for connection to the console equipment.

The relays and I/O CPU Control Board get their power from the network cable. The Control Board will plug onto the relay board to provide the I/O and network interface.

Booth Termination Panel

This panel provides the outputs to control the following functions:

Outputs:

- Top Masking; Flat/Scope/Special
- Side Masking; Flat/Scope/Special
- Curtains; Open/Close
- House Lights; Up, Down, Mid 1, Mid 2
- Stage Lights; Up, Down
- Environment; On/Off
- Slide Projector; On/Off
- Sound Processor; Mono, SVA, SR, Digital 1, Aux, Nonsync

Inputs:

- Remote Start

- Remote Stop/Fire Stop

Features:

- Low power dry relay contact outputs.
- High power dry relay contact outputs for Slide Projector and Environment Control
- A plug-in I/O CPU Control Board to handle I/O and serial interface.
- Override connector for plug-in cable to override switches.
- Override connector for optional override switches.
- Large terminal blocks for user interface.

This Panel (PC board) will connect to the to the Local I/O Network (LIN). The outputs can be configured at the PC Host.

The relays and plug-in I/O CPU Control Board get their power from the LIN cable. This board will generally be mounted in a cabinet on the booth wall, but can also be mounted in the console next to the Booth Termination Panel.

Single Termination Panel

This panel combines most of the functions of the Console and Booth Terminal Panels. The connections and functions are listed below:

Outputs:

- Projector Motor; On/Off
- Xenon Lamp; On/Off
- Changeover; Open/Close
- Lens Turret; Flat/Scope/Special
- Slide Projector; On/Off
- Masking; Flat/Scope/Special
- Curtains; Open/Close
- House Lights; Up, Down, Mid 1, Mid 2
- Stage Lights; Up, Down
- Sound Processor; Mono, SVA, SR, Digital, Aux, Nonsync, Mute

Inputs:

- Film Presence
- Film Motion
- Film Tension/Remote Stop
- Cue Input
- Xenon Fault

Features:

- Low power *dry* relay contact outputs.
- High power *dry* relay contact outputs.
- Override connectors for plug-in cable to override switches.
- Projector motor fuse.
- Changeover fuse.
- Plug-in I/O CPU Control Board to handle I/O and serial interface.
- Terminal Blocks for connection to the console and booth equipment.

The relays and I/O CPU Control Board get their power from the network cable. The Control Board will plug onto the relay board to provide the I/O and network interface.

Section 2
INSTALLATION

The Installation section of this manual provides detailed wiring diagrams to aid in the installation process. A special section entitled *Installation Guidelines* is included to provide the installer with a set of important rules to follow that will help insure a successful installation.

Equipment Required

The CNA-150 should be installed only by an electrician, engineer or other qualified personnel. No special equipment or tools are required for installation. Typically the CNA-150 main controller and Console termination panel will be mounted in the Strong console and factory pre-wired.

Equipment Inspection

The equipment should be carefully inspected for signs of visible damage resulting from transportation and handling. Please notify the freight carrier immediately if damage is found.

Installation Guidelines

The CNA-150 automation system is a microprocessor based theatre automation. Field installations over the past several years have indicated that common wiring practices vary by region and by installation. For this reason, a set of guidelines which will assist with the successful installation of the CNA-150 is listed below.

Microcomputers by their very nature, are susceptible to noise and power supply fluctuations. While the CNA-150 was designed to function in a noisy environment and survive poor installations, it is to the benefit to the end user that these guidelines be followed.

The items listed below are the result of 25 years of industrial experience and are common, accepted practice for the installation of industrial microcomputers. The cost of implementing is minimal while their benefit is immeasurable.

1. Inspect the product for shipping damage immediately upon receipt. In the event of damage, file a claim with the carrier immediately.

2. Verify that all the relays are seated in their sockets and that all cables are firmly

attached.

3. Verify the proper jumper and DIP switch configurations.

4. Verify that the power supply is set for the correct line voltage.

5. Insure that all requirements of national and local electrical codes are satisfied during installation. Run *clean* power (dedicated to the CNA-150 systems only) to all automations from the service entrance panel or the closest branch panel. The line, neutral and ground wires should all run back to the main service panel (separate from all other loads). It is acceptable and preferred and preferred if all automations were run from a single distribution point.

   IMPORTANT NOTE: Do not connect the projector motors, changeovers, xenon rectifiers or other heavy or noisy loads to this circuit.

6. It is imperative that the automation have a **good ground**. This is important in terms of safety and performance. The automation has an interference filter for the AC inputs. The specific intent of the filter is to reduce the effect of interference (noise) on the AC line that provides power to the unit, by providing a "leakage" path to ground from the power lines.

   Important note: Unless an earth ground is provided this leakage can pose an electrical shock hazard.

   In new installations use a copper conductor (not the conduit) from the automation back to the service entrance ground. Connect all automations in the booth to this ground point. This arrangement is best and most reliable. If this is not practical, (such as a retrofit for example), provide the best "earth" ground possible.

   A second best setup would be to run copper wire back to the ground lug in a branch panel.

   The minimum acceptable grounding method is conduit ground back to the branch box. In some installations satisfactory operation with this ground may not be possible.

7. Do not run the line voltage power wires in the same raceways as the low voltage signal wires. This is important from both a safety standpoint and a system reliability standpoint. It is best to keep the failsafe, cue detector, LIN, LSN, sound format and dimmer control wires separate from projector motor,

changeover, xenon lamp, and other power carrying wires. If it is essential that they be run in the same duct, keep them separated in the duct.

Wiring the CNA-150 System

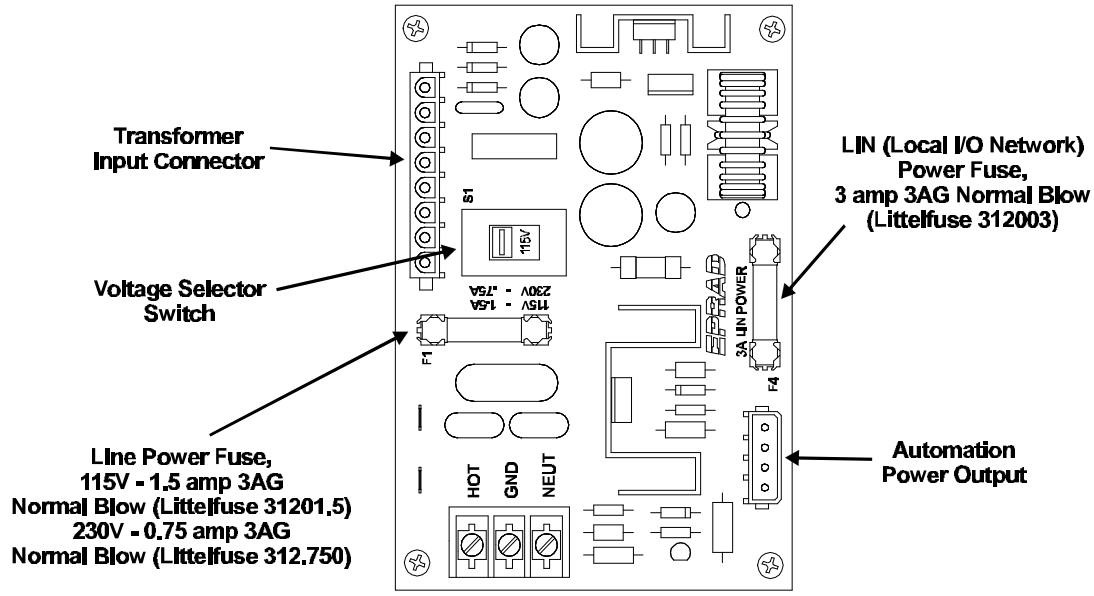
Remember, during installation to insure that all requirements of national and local electric codes are satisfied. Be sure to run *clean* power (dedicated to the CNA-150 systems only) to all CNA-150 automation systems from the service entrance panel or closest branch panel. The line, neutral and ground wires should all run back to the main service panel (separate from all other loads). It is acceptable and preferred if all automations were run from a single distribution point.

Important Note: Do not connect the projector motors, changeovers, xenon rectifiers or other heavy or noisy loads to this circuit.

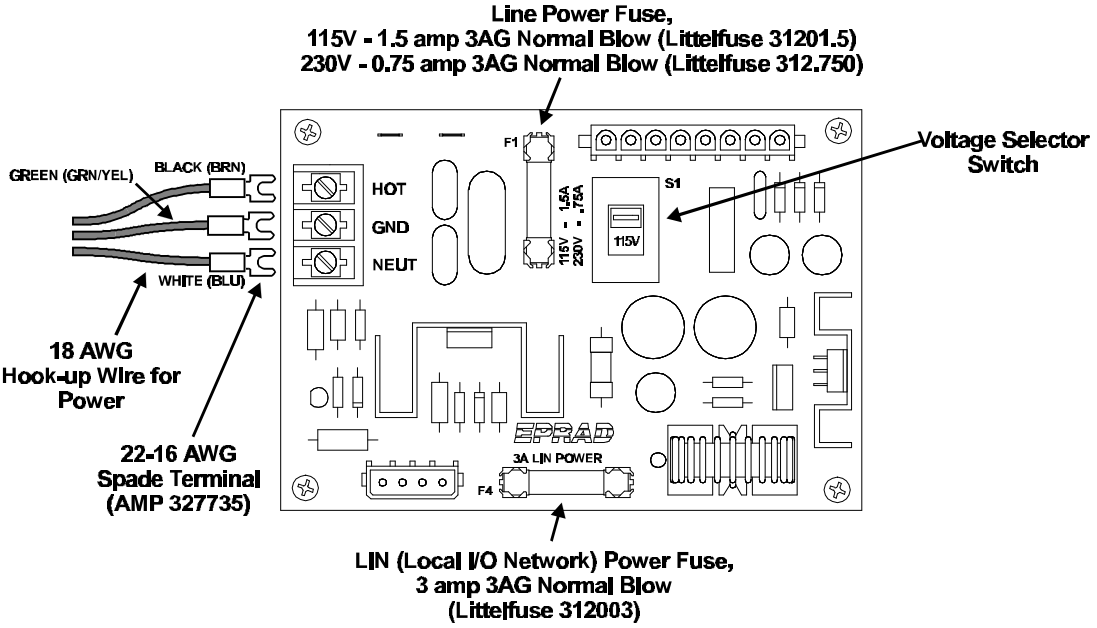
Before applying power, verify that the power supply inside the unit is set to the same voltage (120V or 230V) that will be powering the unit. If it is not, move the switch S1 to the appropriate position. To access the power supply in the rack mount unit, open the front panel by removing the two screws from the front panel. The front panel will hinge down. The power supply board is mounted to the back wall. The switch S1 can be set with a small *flat-blade* screwdriver. Figure 2.1 shows the power supply power terminations and voltage selector switch.

To access the power supply in the wall mount unit, remove the front cover by loosening the four Phillips-head screws.

There are also two field-replaceable fuses on the power supply board. F1 is the line power fuse and F4 is the LIN (Local I/O Network) power fuse. Remember, before servicing these fuses, be sure power is removed from the unit.



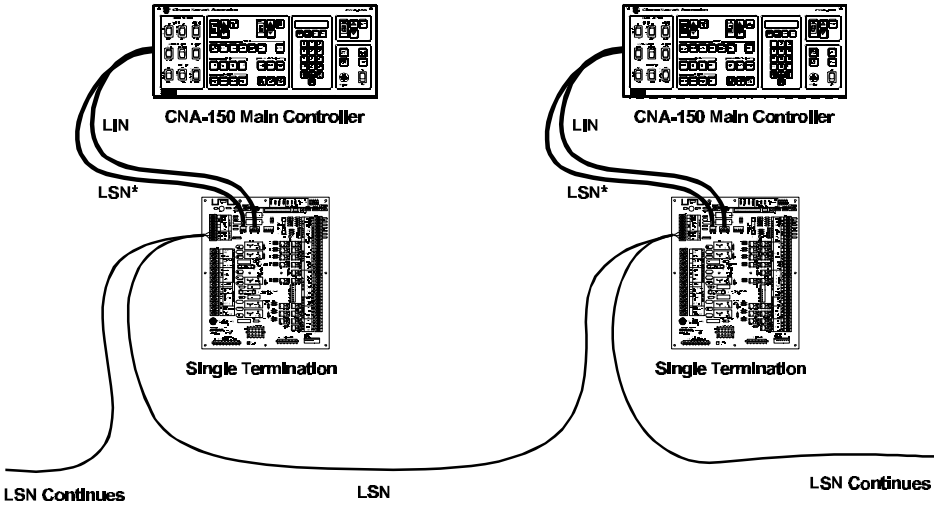
Rack Mount Power Supply Configuration



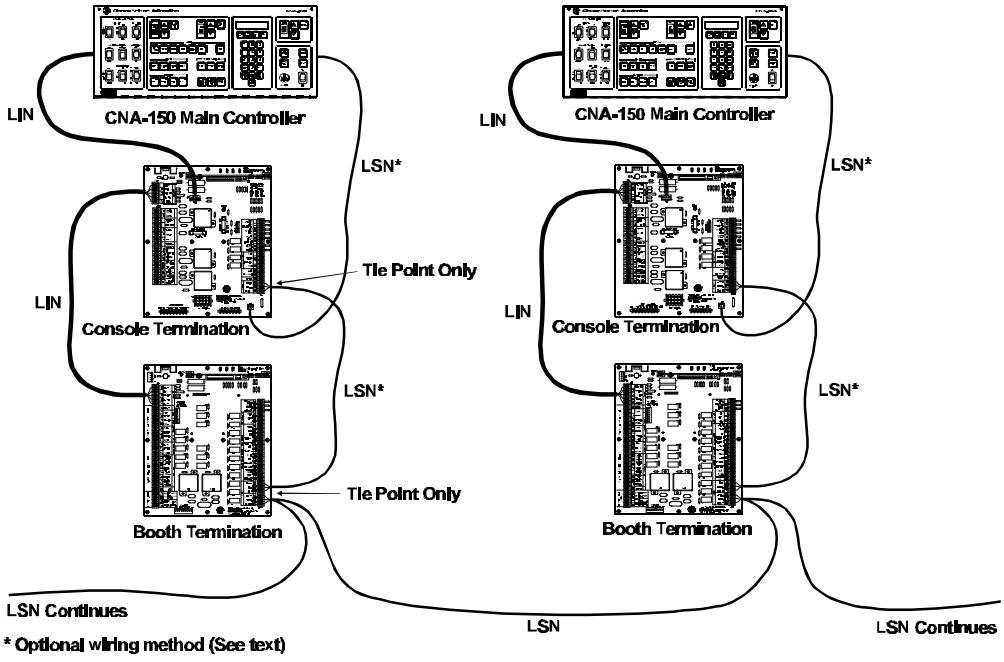
Wall Mount Power Supply Configuration

Figure 2.1

Wiring between the CNA-150 automations and termination boards are shown in figure 2.2. The wiring between the termination panels and other CNA systems are accomplished with two communication networks. These are the LIN and LSN.



Wiring to the 39332 Single Termination Panel and between CNA-150 Automations



Wiring to the 39330 Console and 39331 Booth Termination Panels and between CNA-150 Automations

Figure 2.2

The CNA-150 Main Controller controls the Console and Booth termination boards via the LIN (Local I/O Network). This is a five wire (four wire + shield) cable that provides the serial communications as well as power to the termination panels. The termination boards are connected in a *daisy-chain* method and are mounted in the booth according to their logical location. For example, the Console termination board would typically be mounted in the console or on the pedestal, and the Booth termination board could be mounted on the wall.

LIN cable specifications: 2 twisted pair, 18 AWG with overall shield and drain wire (Alpha #5132C or equivalent).

Communication wiring between CNA-150 systems is accomplished via the LSN (Local Sync Network). The LSN provides a communications path between the CNA-150s, Remote Monitors and a PC host. The network supports synchronous communications for interlock, copy functions and remote status and control.

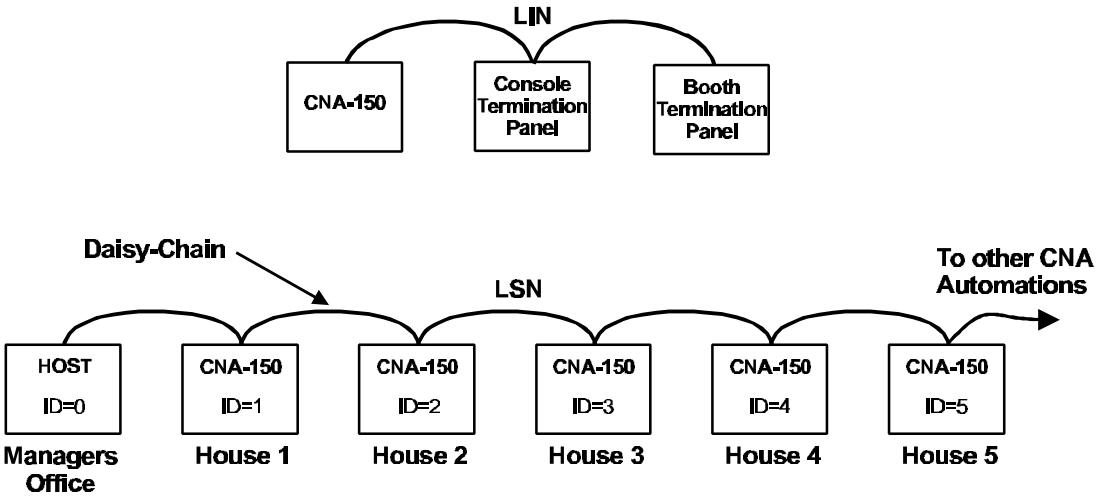
***** Figure 2.2 shows the LSN cable wired between the main controller (39325 Main Board) and termination boards. The connections on the termination boards are tie points only, that provide a path to the main controller. It is not necessary that the LSN be wired to both boards. It will typically be more convenient for the installer to connect CNA-150 systems together at the Booth termination board if it is mounted on the booth wall. But, if both boards are mounted in the console, the LSN can be wired to either board.

The cable is 3 conductor, twisted pair with a shield. Wire gage is dependent on the length of wire needed. In general, 24 AWG is sufficient. Many cable manufactures offer a broad range of 120-ohm cables designed for RS-485 applications.

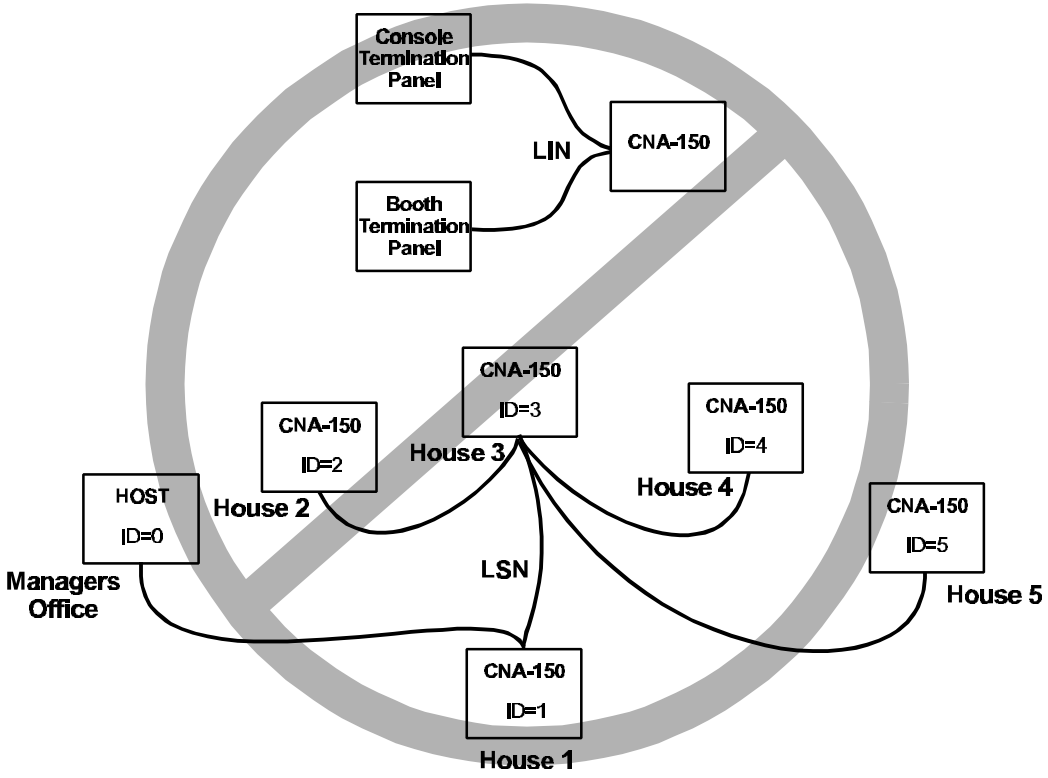
LSN cable specifications: Twisted pair, 24 AWG with overall shield and drain wire (Alpha #6412, Belden #9841 or equivalent).

When planning the communications wiring, keep the cable away from equipment that generates electrical noise, such as power conduits, fluorescent lighting fixtures, air conditioners, etc. Choose cable routing paths in such a way to prevent damage to the cable.

The required method for communication wiring of the LSN and LIN is the daisy-chain configuration, a system in which the transmission line continues from one unit to the next. See figure 2.3 for the daisy chain connection topology. The bus must form a continuous path. Devices must not be branched or spoked.



(a) Correct - The optimal configuration for the RS-485 bus is the daisy-chain connection.



(b) Incorrect - This may create transmission line problems. Must be Daisy-Chained, not branched or home run.

Figure 2.3

The LSN and LIN cables that connect the main board to the console termination board are shown in figure 2.4.

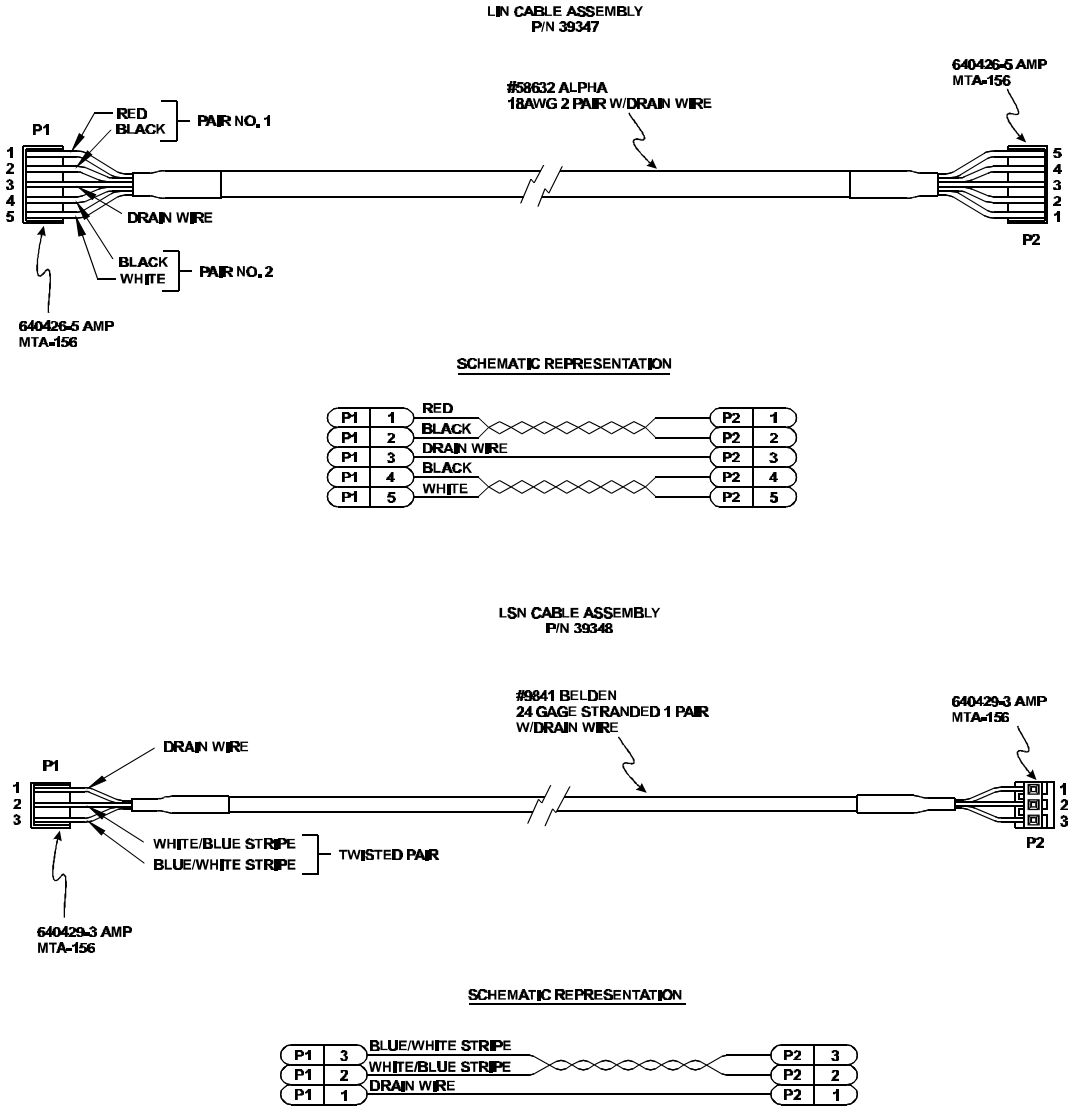
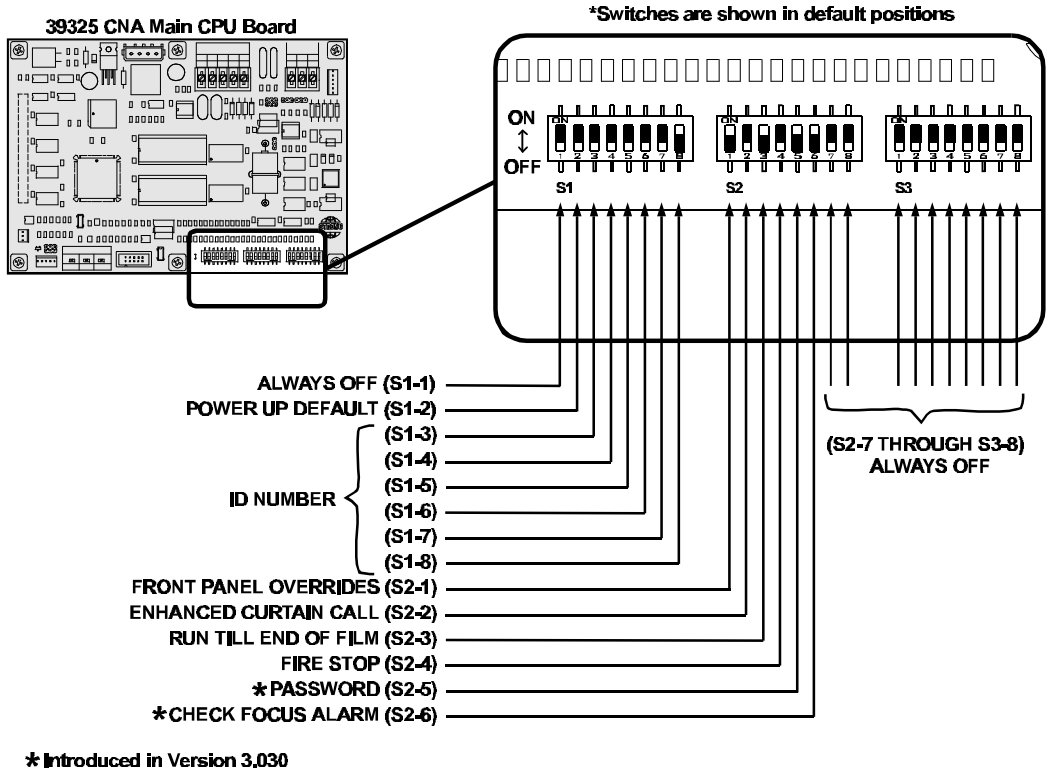


Figure 2.4

DIP Switch Settings

The LSN can support up to 64 devices (CNA-100s, CNA-150s, CNA-200s, Remote Status Monitors and a Host Computer). **Each device will each require a unique Sync Id number.** Id 0 is reserved for the *Host PC* and Ids 1 through 63 are assigned to CNA-150s and other devices as necessary. To keep things simple, assign the CNA-150 Ids starting at 1, corresponding to the house number and working up. The Remote Monitor's Ids, if used, should be assigned to the higher numbers starting at 62 and working down. You may want to keep Id 63 reserved for the portable or *secondary* host.

To set the Id number, first locate the eight position dip switch designated S1. See figure 2.5.



Switch Definitions

S1-1 On : Force Bootloader.
Off : Normal Use. (Factory Default)

S1-2 On : Force "Supervisory Defaults" on power up. Default Supervisory data will be restored on each power up. (Factory Default)
Off : Will **not** overwrite user-programmed supervisory data on power up. If you change any of the default settings with the Host program this switch must be off or the next time the CNA-150 is powered up all user settings will be over-written with the defaults.

S1-3 through **S1-8** are used to set the ID number. The number is represented as a 6-bit binary number which allows for 64 possible ID numbers (0-63). Do not use 0 (zero) as an ID number. It has been reserved for the PC Gateway Interface. Each bit (switch) has a decimal value. Add up the decimal values to get the ID number. For example, ID number 15 would be 8+4+2+1=15 or a DIP switch setting of 001111. See Figure 2.15.

S1-3 On : 1 Decimal value = 32
Off : 0 Decimal value = 0 (Factory Default)

S1-4 On : 1 Decimal value = 16
Off : 0 Decimal value = 0 (Factory Default)

S1-5 On : 1 Decimal value = 8
Off : 0 Decimal value = 0 (Factory Default)

S1-6 On : 1 Decimal value = 4
Off : 0 Decimal value = 0 (Factory Default)

S1-7 On : 1 Decimal value = 2
Off : 0 Decimal value = 0 (Factory Default)

S1-8 On : 1 Decimal value = 1 (Factory Default)
Off : 0 Decimal value = 0

S2-1 On : Enable front panel overrides. The Sound, Lights, Lens/Masking and Auxiliary front panel switches will override the outputs without affecting the program. The next instruction will override any manual changes. (Factory Default)
Off : Disable front panel overrides. The Sound, Lights, Lens/Masking and Auxiliary front panel switches are only used for programming.

S2-2 On : Enables the new Curtain Call function and overrides the original Curtain Call function. Place the Curtain Call cue at a distance before the next cue that is equal to the curtain close time. When

the CNA-150 sees the Curtain Call cue, the curtains begin to close, the changeover closes and sound is muted. At the next cue, the curtains will begin to open. After the CURTAIN CLOSE TIMER counts down to zero, the curtain will be fully open and the changeover will open and the sound is selected.

Off : Original Curtain Call function. (Factory Default)

S2-3 On : Enables the "Run til End of Film" function. This overrides the normal 7 second motor off delay. The projector motor will run until the film runs out of the failsafe. (Factory Default)

Off : Disables the "Run til End of Film" function. The projector motor will shut off after the normal 7 second delay.

S2-4 On : Enables the "Fire Stop" function.

39331 Booth Termination Board - Converts the Remote Stop input to a Fire Stop input and the Slide Projector relay (K13) to a Fire Stop output. Fire Stop *acts* like a Remote Stop with the following exceptions:

- Sound is Muted.
- Slide Projector on 39330 *Console Termination Board* is turned off *or* held off.
- K13 relay (Slide Projector) on Booth Termination board is turned on.

39332 Termination Board - Remote Stop input must be enabled on board. (W1-OPT1 jumper across pins 2 and 3 changes the Film Tension input to a Remote Stop input.) Converts the Remote Stop input to a Fire Stop input. Fire Stop *acts* like a Remote Stop with the following exceptions:

- Sound is Muted.
- Slide Projector is turned off *or* held off.

Off : Disables the "Fire Stop" function. (Factory Default)

S2-5 On : Requires use of the password to access many of the functions. (Factory Default)

Off : Disables the password. No password is required to access the functions.

Note: Version 3.030 and later.

S2-6 On : Enables the "Check Focus Alarm" function. In Timed Start the alarm will sound prior to the show starting. (Factory Default)
Off : Disables the "Check Focus Alarm" function.

Note: Version 3.030 and later.

S2-7 through **S3-8**
On : Undefined
Off : Undefined (Factory Default)

Use figure 2.6 to configure the Id number with switches S1-3 through S1-8.

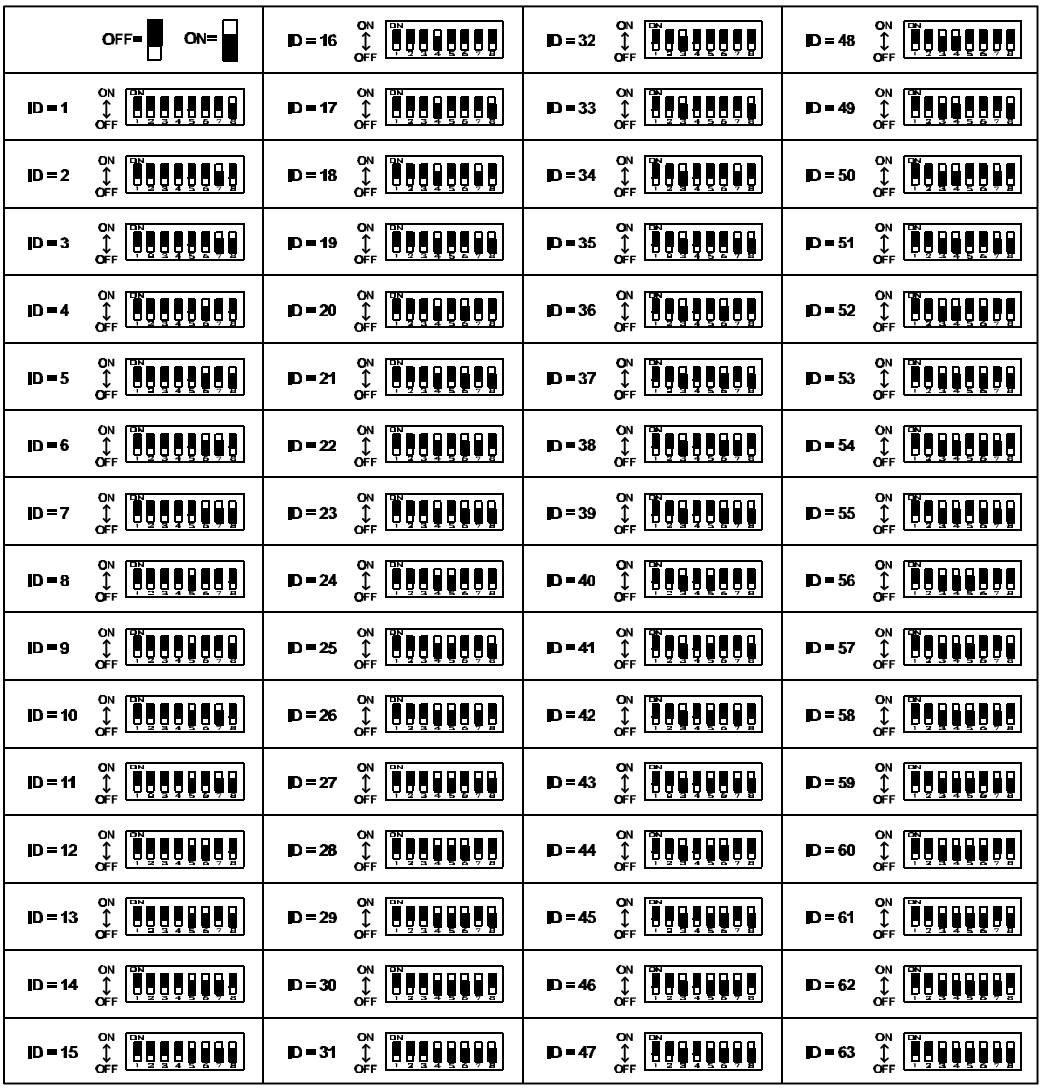


Figure 2.6

Alarm Loudness setting

The alarm loudness can be set for one of three intensities; LOW (87 dBA), MEDIUM (94 dBA), HIGH (98 dBA). See figure 2.7 below.

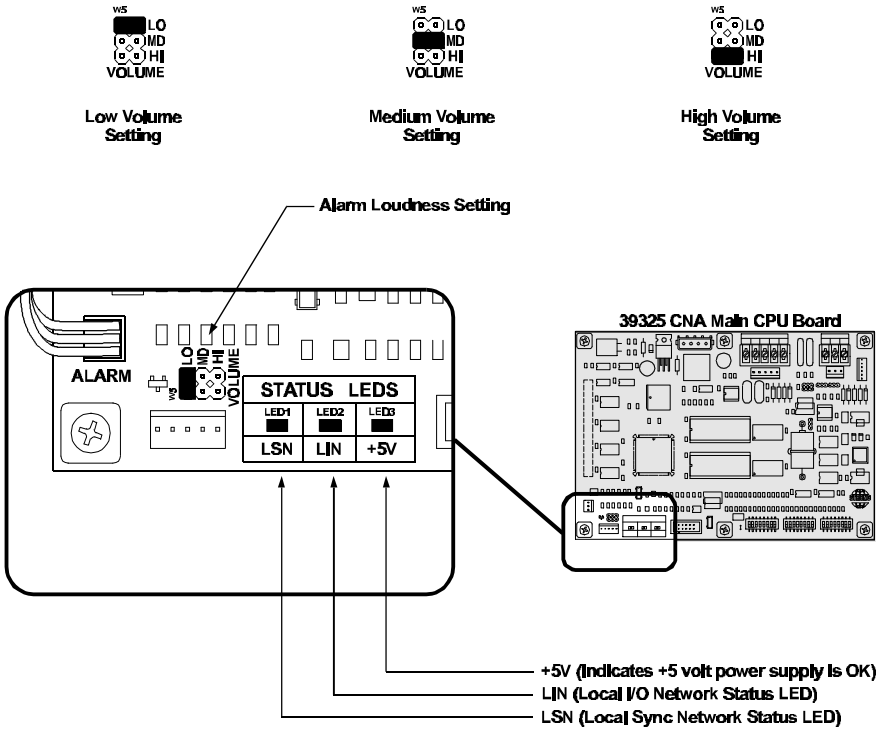


Figure 2.7

Status LEDs

There are three status LEDs on the 39325 Main CPU Board. These indicate the status of the +5 volt power supply, the LSN and the LIN. Following are the three conditions for the LIN and LSN LEDs:

Fast Blinking Rate: The CNA-150 computer is working and is communicating properly.

Slow Blinking Rate: The CNA-150 computer is working, but is *not* communicating.

Off: The CNA-150 computer has a problem.

Battery

With power off, the battery insures that stored programs will not be lost. Be sure the battery is seated properly in the sockets and the battery jumper W4 is in the ON position. The battery should provide several years of memory back up.

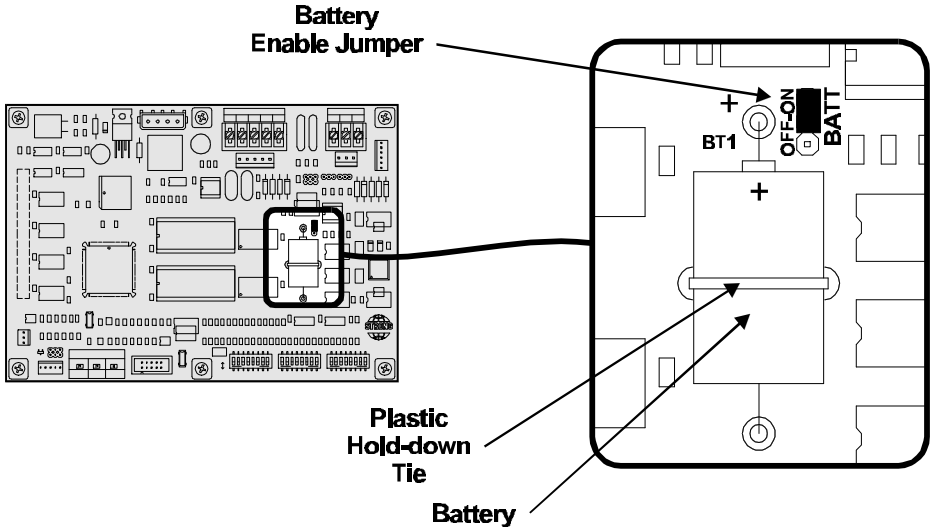
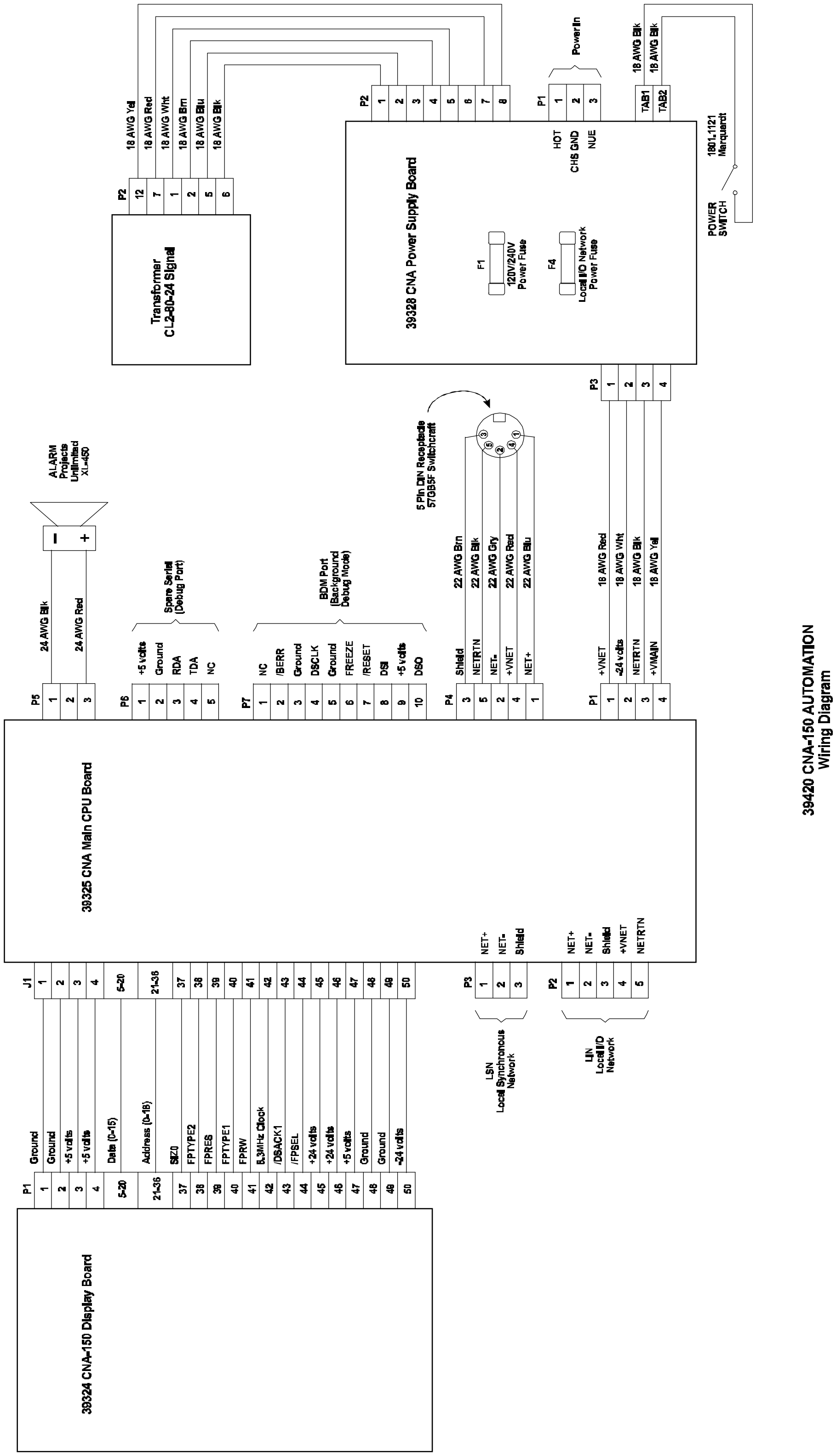


Figure 2.8


Transformer
CL2-80-24 Signal
39328 CNA Power Supply Board
F1
120V/240V
Power Fuse
F4
Local I/O Network
Power Fuse
POWER
SWITCH
1801,1121
Marquardt
Power In
ALARM
Projects
Unlimited
XL-450
5 Pin DIN Receptacle
57GB5F Switchcraft
Spare Serial
(Debug Port)
BDM Port
(Background
Debug Mode)
39325 CNA Main CPU Board
LSN
Local Synchronous
Network
LIN
Local I/O
Network
39324 CNA-150 Display Board
39420 CNA-150 AUTOMATION
Wiring Diagram

Termination Boards

All of the booth and auditorium devices (xenon lamp, projector motor, lights, etc.) are wired to the 39330 Console Termination Board and the 39331 Booth Termination Board. The Console Termination Board is shown in figure 2.10.

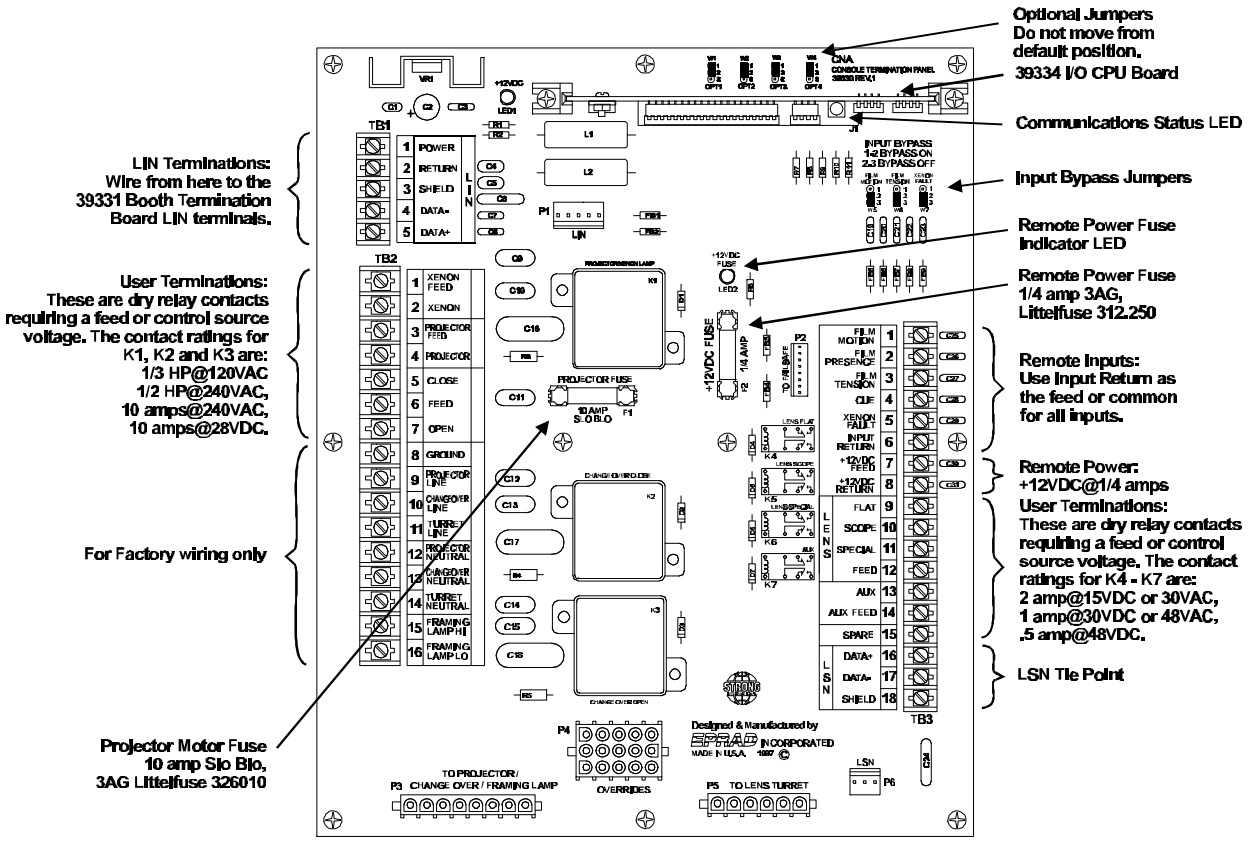


Figure 2.10

The 39334 I/O CPU Board plugs into the J1 connector on the Console termination board. The purpose of this board is to handle the communications from the CNA-150 Main Board and to control the inputs and outputs. The Status LED on this board indicates the following:

Fast Blinking Rate: The I/O CPU computer is working and is communicating properly with the CNA-150 Main Board (Master).

1 Blink On, Pause: The I/O CPU computer is waiting for data from the Master, and the I/O is disabled.

2 Blinks On, Pause: Communications Timeout, I/O is disabled.
The Booth Termination Board is shown in figure 2.11.

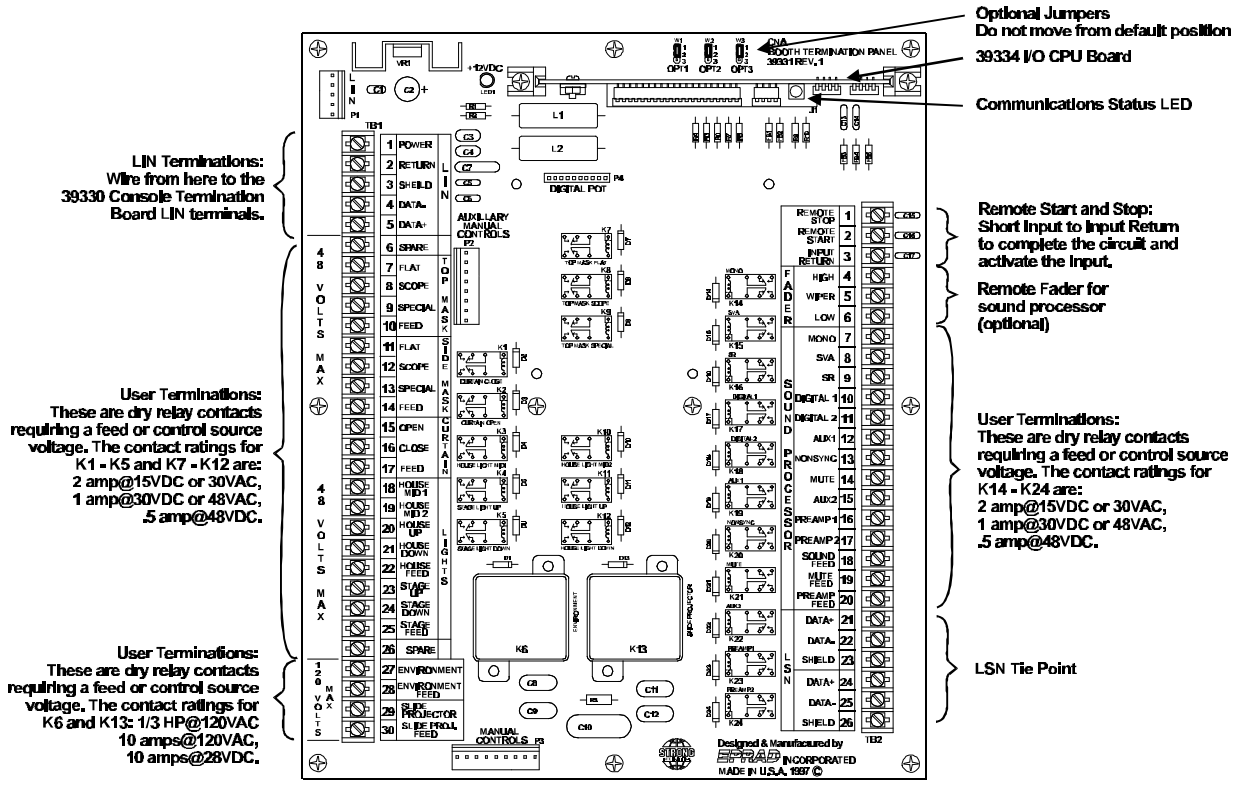


Figure 2.11

The 39334 I/O CPU Board plugs into the J1 connector on the Console termination board. The purpose of this board is to handle the communications from the CNA-150 Main Board and to control the inputs and outputs. The Status LED on this board indicates the following:

Fast Blinking Rate: The I/O CPU computer is working and is communicating properly with the CNA-150 Main Board (Master).

1 Blink On, Pause: The I/O CPU computer is waiting for data from the Master, and the I/O is disabled.
2 Blinks On, Pause: Communications Timeout, I/O is disabled.

The 39332 'Single Termination' board is shown in figure 2.12. This board combines most of the functions of the 39330 and 39331 boards. If the 39332 board is used the 39330 and 39331 boards are not required. The 39334 I/O CPU board plugs into the J1 connector. If you have a CNA-150, it is most likely using the 39332 termination board.

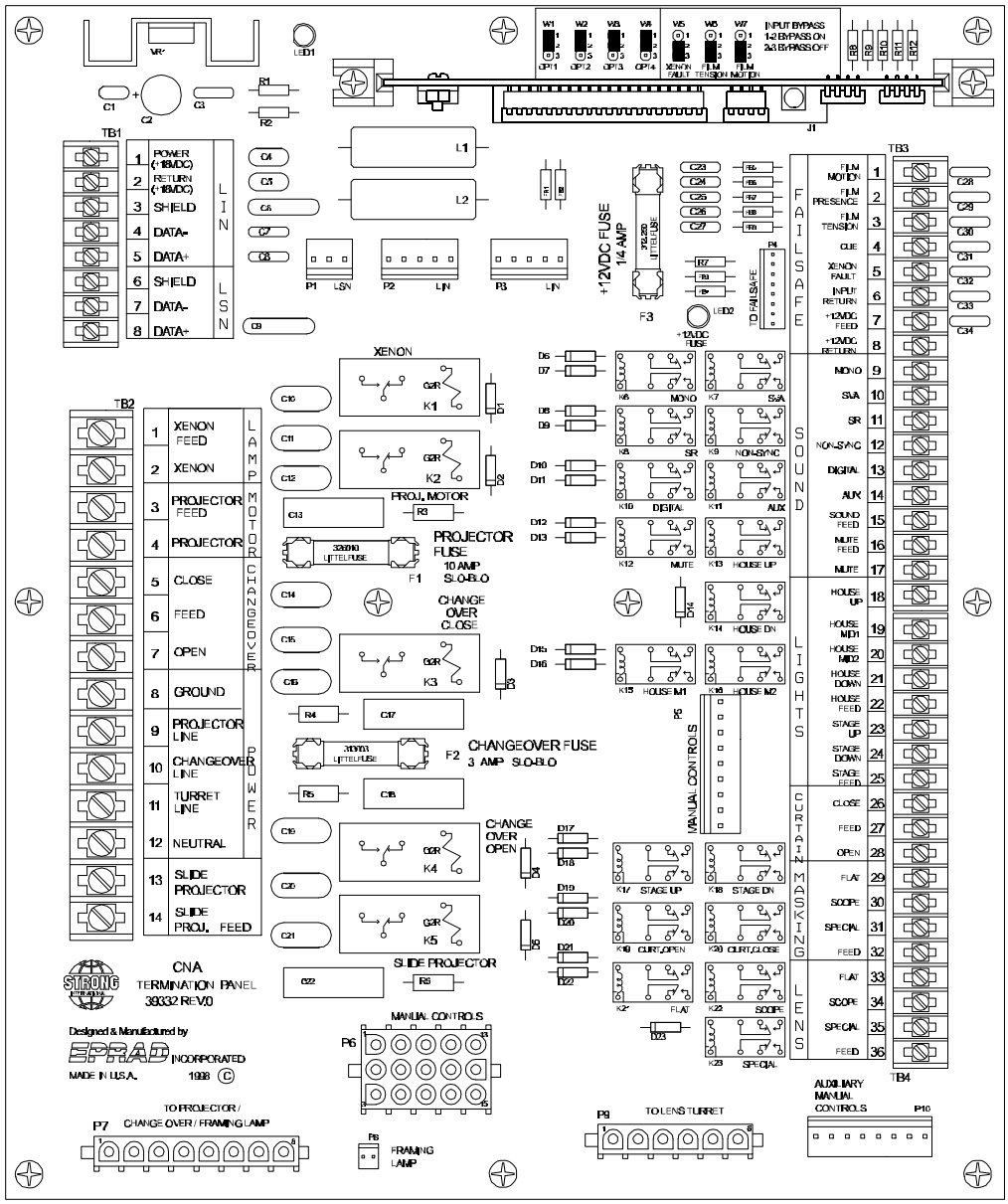


Figure 2.12

Termination Schedule for the 39332 Termination Board:

TB1 These are the LSN and LIN connections. TB1-1 through TB1-5 are used to terminate the LIN wiring *from* the CNA Automation to the 39332 board and to any other LIN devices such as the RVC-10 and ACP-50. TB1-6 through TB1-8 are used to terminate the LSN wiring from the CNA Automation. These are used as a tie point for the network connection to other CNA Automations.

TB1-1 : Power (+18VDC)
TB1-2 : Return (+18VDC)
TB1-3 : Shield
TB1-4 : Data-
TB1-5 : Data+
TB1-6 : Shield
TB1-7 : Data-
TB1-8 : Data+

TB2 These are the high power connections. TB2-1 through TB2-7 and TB2-13 and TB2-14 are connected to the high power relay contacts. All relay contacts are 'dry' (no voltage) and require a feed voltage. TB2-8 through TB2-12 are special and are for factory wiring only.

TB2-1	: Xenon Feed	(Relay K1)
TB2-2	: Xenon	(Relay K1)
TB2-3	: Projector Feed	(Relay K2)
TB2-4	: Projector	(Relay K2)
TB2-5	: Changeover Close	(Relay K3)
TB2-6	: Changeover Feed	(Relay K3 and K4)
TB2-7	: Changeover Open	(Relay K4)
TB2-8	: Ground	(Factory Use Only)
TB2-9	: Projector Line	(Factory Use Only)
TB2-10	: Changeover Line	(Factory Use Only)
TB2-11	: Turret Line	(Factory Use Only)
TB2-12	: Neutral	(Factory Use Only)
TB2-13	: Slide Projector	(Relay K5)
TB2-14	: Slide Projector	(Relay K5)

K1, K2, K3 and K4 contacts are rated for 10 Amps @ 250VAC and 10 Amps @ 30VDC. Both the projector and changeover outputs are protected with fuses. This protects the termination board as well as your

equipment. The projector fuse (F1) is a 10 amp (3AG Slo-Blo Littelfuse #326010) and the changeover fuse (F2) is a 3 amp (3AG Slo-Blo Littelfuse #313003).

The projector, changeover and slide projector outputs have an RC network across their contacts. The purpose of the RC network is to protect the relay contacts. The capacitor C acts to suppress the discharge the moment the contacts open. Resistor R acts to limit the current when the power is turned on the next time. If the impedance of the load is not sufficiently smaller than the impedance of the RC circuit it may continue to operate even when the contacts are open. This is not a problem with the projector motor or changeover solenoid, but may be with the slide projector. If it is a problem, it will be necessary to remove R6 from the termination board. *Caution: There is enough leakage current through the RC circuit to present a potential electrical hazzard to the installer.*

TB3 These are the failsafe inputs and low power outputs for sound, lights, curtains, masking and lens. TB3-1 through TB3-8 are dedicated to failsafe operation. TB3-9 through TB3-36 are all low power dry relay contacts.

TB3-1	: Film Motion	This input is used with a film motion device that is required for some installations. If this input is not used be sure the W7 jumper is in the bypass position.
TB3-2	: Film Presence	
TB3-3	: Film Tension	Becomes a Remote Stop input when the W1 (OPT1) jumper is across pins 2 and 3. Remote Stop becomes a Fire Stop input when that option is enabled at the CNA Automation. The Fire Stop alarm is activated when it is shorted to Input Return terminal.

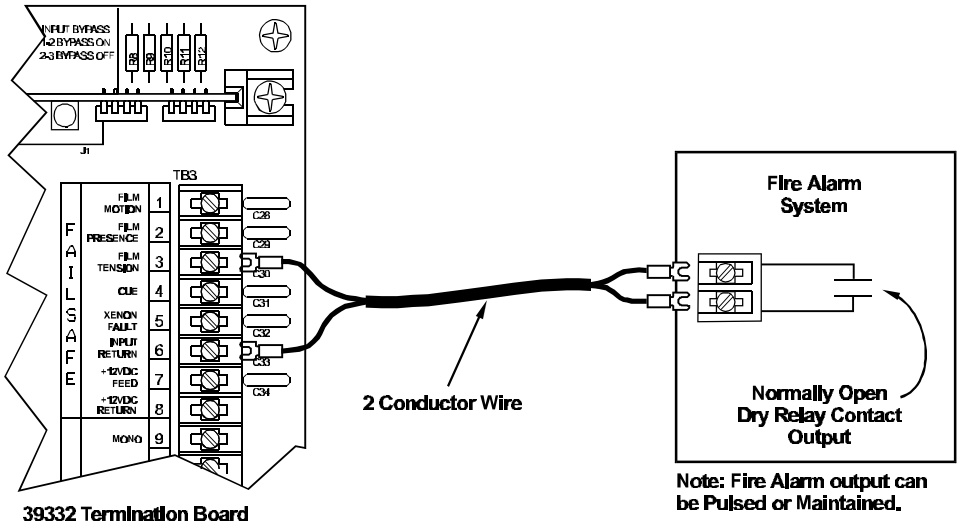


Figure 2.13

TB3-4 : Cue
TB3-5 : Xenon Fault
TB3-6 : Input Return Current return path for all inputs.
TB3-7 : +12VDC Feed
TB3-8 : +12VDC Return

TB3-7 and TB3-8 are used to power the film failsafe and cue detector. This power supply is fused at 1/4 amps. (Fuse F3 Littelfuse #312.250).

SOUND:

TB3-9	: Mono	(Relay K6)
TB3-10	: SVA	(Relay K7)
TB3-11	: SR	(Relay K8)
TB3-12	: Non-Sync	(Relay K9)
TB3-13	: Digital	(Relay K10)
TB3-14	: Aux	(Relay K11)
TB3-15	: Sound Feed	
TB3-16	: Mute Feed	(Relay K12)
TB3-17	: Mute	

LIGHTS:

TB3-18	: House Lights Up	(Relay K13)
TB3-19	: House Lights Mid 1	(Relay K15)
TB3-20	: House Lights Mid 2	(Relay K16)
TB3-21	: House Lights Down	(Relay K14)
TB3-22	: House Lights Feed	
TB3-23	: Stage Lights Up	(Relay K17)
TB3-24	: Stage Lights Down	(Relay K18)
TB3-25	: Stage Lights Feed	

CURTAIN:

TB3-26	: Curtain Close	(Relay K20)
TB3-27	: Curtain Feed	
TB3-28	: Curtain Open	(Relay K19)

MASKING:

TB3-29	: Masking Flat	(Relay K21)
TB3-30	: Masking Scope	(Relay K22)
TB3-31	: Masking Special	(Relay K23)
TB3-32	: Masking Feed	

LENS:

TB3-33	: Lens Flat	(Relay K21)
TB3-34	: Lens Scope	(Relay K22)
TB3-35	: Lens Special	(Relay K23)
TB3-36	: Lens Feed	

Optional and Bypass Jumpers for the 39332 Termination Board:

W1	: Opt 1	1-2:	TB3-3 is a Film Tension input
		2-3:	TB3-3 is a Remote Stop input
W2	: Opt 2	1-2:	Undefined
		2-3:	Undefined
W3	: Opt 3	1-2:	Undefined
		2-3:	Undefined

W4 : Opt 4	1-2:	Undefined	
	2-3:	Undefined	
W5 : Xenon Fault	1-2:	Bypass On (shorted to Input Return)	
	2-3:	Bypass Off (not shorted to Input Return)	
W6 : Film Tension	1-2:	Bypass On (shorted to Input Return)	
	2-3:	Bypass Off (not shorted to Input Return)	
W7 : Film Motion	1-2:	Bypass On (shorted to Input Return)	
	2-3:	Bypass Off (not shorted to Input Return)	

There are three connectors for the manual control cables:

P6 Manual Controls: Xenon, Projector, Changeover and Lens

P6-1 : Xenon Feed
P6-2 : Projector Feed
P6-3 : Xenon
P6-4 : Changeover Open
P6-5 : N/C
P6-6 : Changeover Close
P6-7 : Changeover Feed
P6-8 : N/C
P6-9 : Projector
P6-10 : N/C
P6-11 : Lens Scope
P6-12 : Lens Special
P6-13 : Lens Feed
P6-14 : Lens Feed
P6-15 : Lens Flat

P5 Manual Controls: Curtain and Lights

P5-1 : Curtain Open
P5-2 : Curtain Feed
P5-3 : Curtain Close
P5-4 : House Lights Up
P5-5 : House Lights Down
P5-6 : House Light Feed

P5-7 : Stage Lights Up
P5-8 : Stage Lights Feed
P5-9 : Stage Lights Down

P10 Auxiliary Manual Controls: Masking

P10-1 : Mask Flat
P10-2 : Mask Scope
P10-3 : Mask Special
P10-4 : Mask Feed
P10-5 : Mask Flat
P10-6 : Mask Scope
P10-7 : Mask Special
P10-8 : Mask Feed

Note: P7 and P9 are for factory use only.

BTC-10 Booth Termination Cabinet

The Booth Termination board can be mounted in the console or optionally in a wall mount cabinet. The BTC-10 wall cabinet can be delivered to the job site early allowing the electrician to pre-wire the curtains, masking motors, LSN (Sync Network), light dimmer and sound processor. The BTC-10 is available with optional manual override switches.

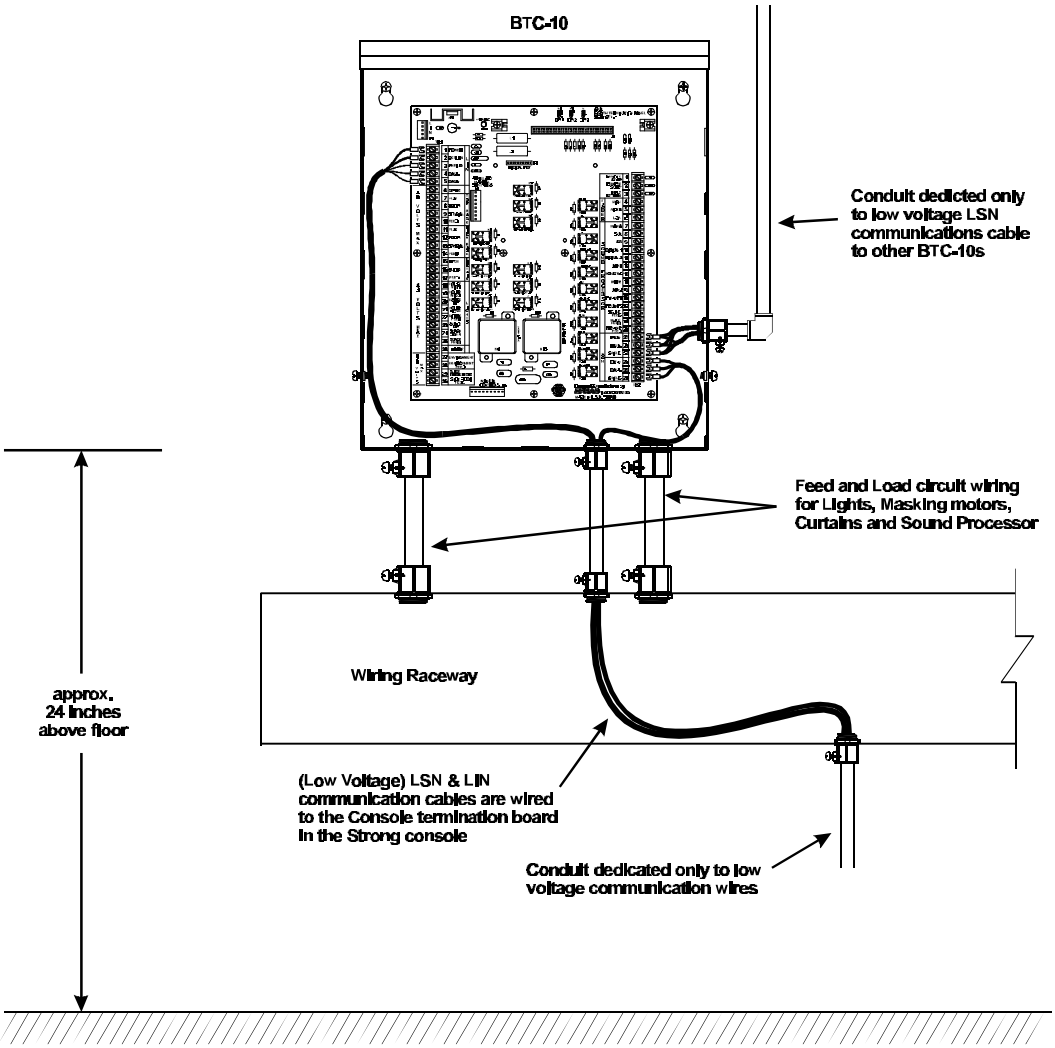


Figure 2.14

Figure 2.14 shows a typical BTC-10 installation. The internal connections required for LSN and LIN communications cables are also shown. The LIN and

one LSN cable is wired to the Console termination board in the Strong Console. Keep all LSN and LIN cables separated from high voltage and electrically noisy wiring by running them in conduit dedicated to low voltage communication wires. The cabinet is constructed of 16 gage steel measuring 16-1/2 inches high by 14 inches wide by 3-1/2 inches deep. The four mounting holes are keyholes capable of accepting 1/4-20 bolts or screws with a maximum head diameter of 7/16 inch.

Begin by locating the four keyhole center lines on the wall. Install the appropriate wall anchors and turn the fasteners until 1/4 inch is left between the head and wall. It is recommended that the top of the BTC-10 not exceed 46" from the floor for proper viewing and operation of the control panel. Hang the cabinet on the four fasteners and secure it by tightening the fasteners.

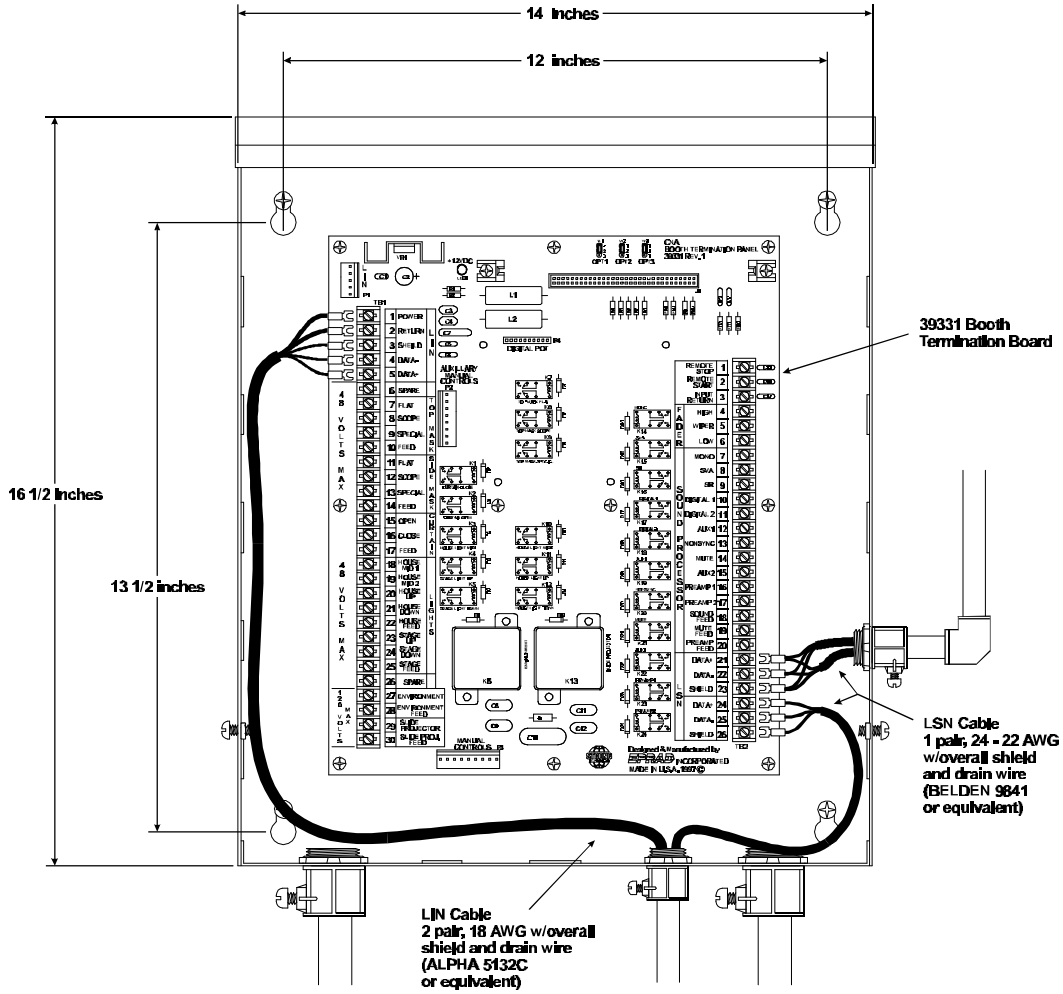


Figure 2.15

7/8 inch and 1-1/8 inch knockouts are provided on the bottom and both sides of the cabinet. Prepare the cabinet for wiring by removing the desired knockouts.

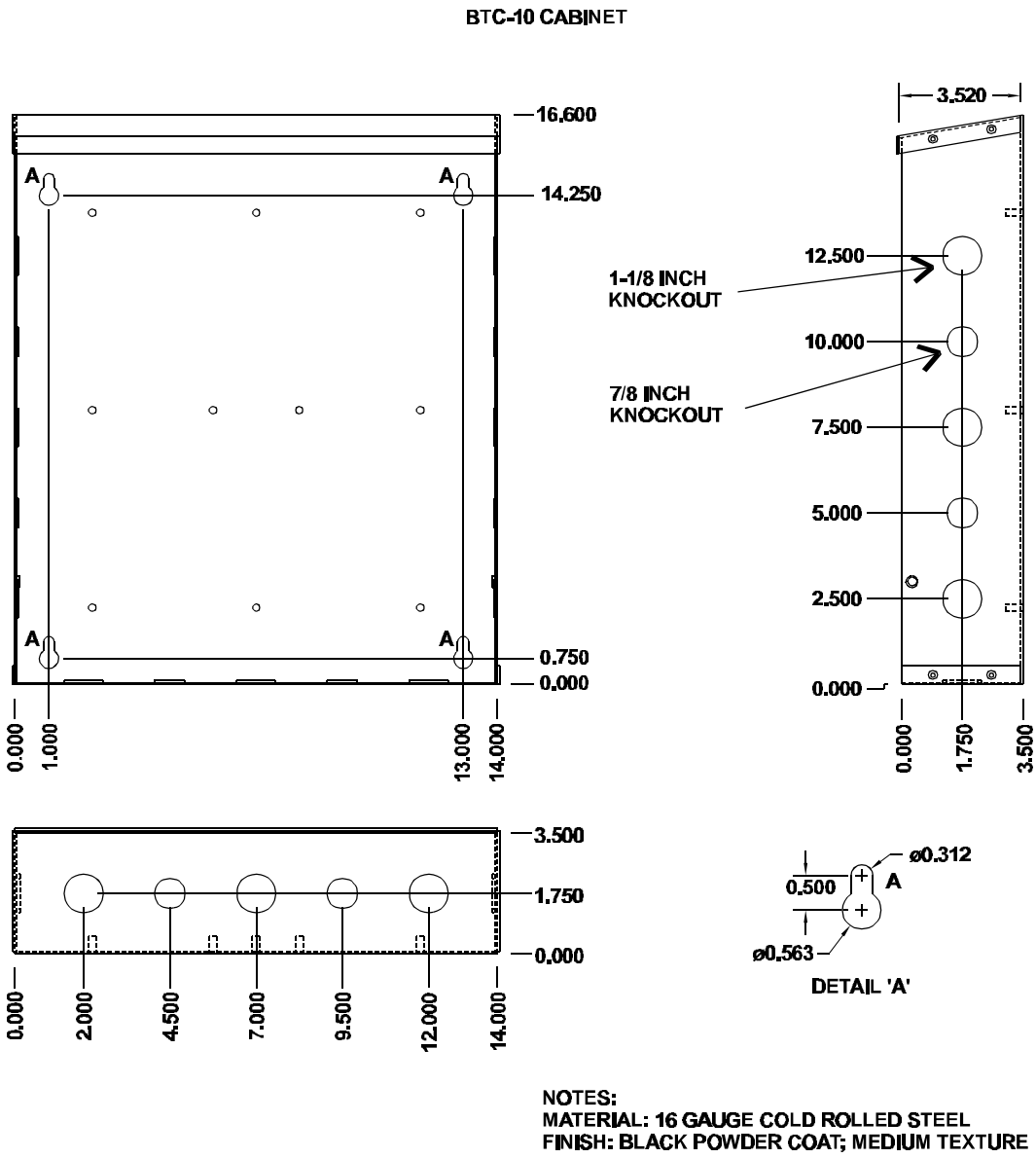


Figure 2.16

The BTC-10 provides (optional) override switches for masking, curtains and auditorium lights. Two auxiliary switches can be installed and their function can be determined by the installer. The auxiliary switches can be either momentary or maintained contact. The momentary switches are rated for 6 amps @ 120 vac and the maintained switches are rated for 16 amps @ 120 vac.

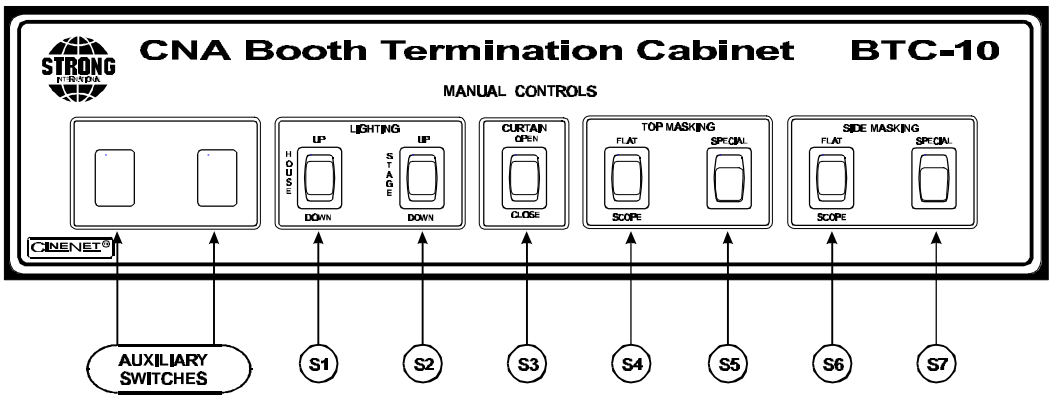


Figure 2.17

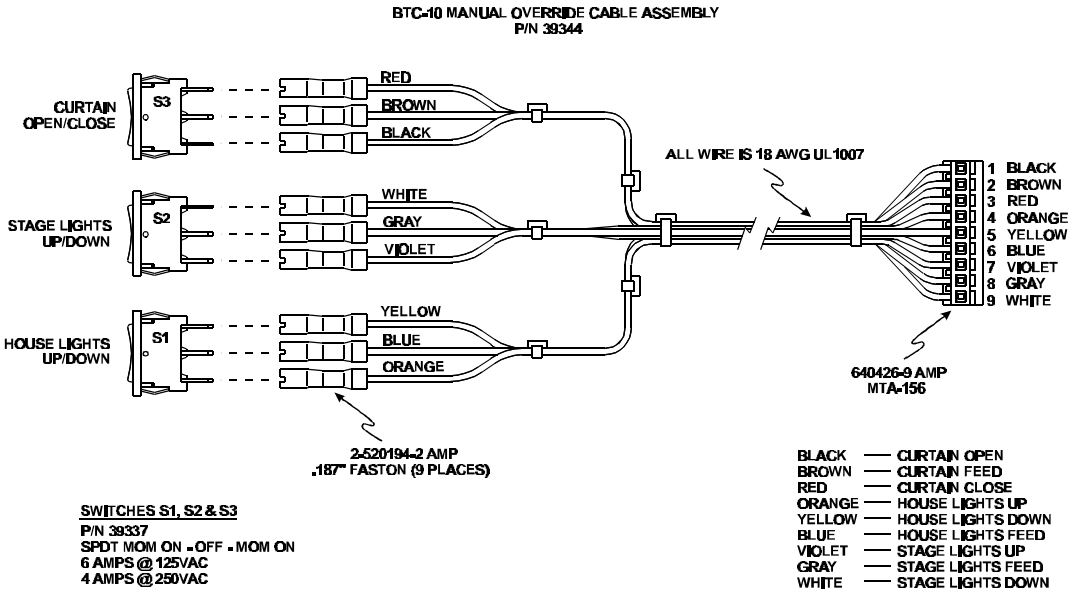
S1 - House Lights UP/DOWN
S2 - Stage Lights UP/DOWN
S3 - Curtains OPEN/CLOSE
S4 - Top Masking FLAT/SCOPE
S5 - Top Masking SPECIAL
S6 - Side Masking FLAT/SCOPE
S7 - Side Masking SPECIAL

Available (standard) Configurations:

Part No. 39340	BTC-10 with no switches
Part No. 39340-1	BTC-10 with S1, S2 & S3
Part No. 39340-2	BTC-10 with S1, S2, S3, S4, S5, S6 & S7
Part No. 39340-3	BTC-10 with S4, S5, S6 & S7

Order auxiliary switches separately.

The manual override cable assembly drawings are shown in Figure 2.18. The 39344 and the 39345 cable assemblies may also be ordered separately.


BTC-10 MANUAL OVERRIDE CABLE ASSEMBLY
P/N 39344
CURTAIN OPEN/CLOSE
S3
RED
BROWN
BLACK
STAGE LIGHTS UP/DOWN
S2
WHITE
GRAY
VIOLET
HOUSE LIGHTS UP/DOWN
S1
YELLOW
BLUE
ORANGE
ALL WIRE IS 18 AWG UL1007
1 BLACK
2 BROWN
3 RED
4 ORANGE
5 YELLOW
6 BLUE
7 VIOLET
8 GRAY
9 WHITE
640426-9 AMP
MTA-156
2-520194-2 AMP
.187" FASTON (9 PLACES)
SWITCHES S1, S2 & S3
P/N 39337
SPDT MOM ON - OFF - MOM ON
6 AMPS @ 125VAC
4 AMPS @ 250VAC
BLACK — CURTAIN OPEN
BROWN — CURTAIN FEED
RED — CURTAIN CLOSE
ORANGE — HOUSE LIGHTS UP
YELLOW — HOUSE LIGHTS DOWN
BLUE — HOUSE LIGHTS FEED
VIOLET — STAGE LIGHTS UP
GRAY — STAGE LIGHTS FEED
WHITE — STAGE LIGHTS DOWN

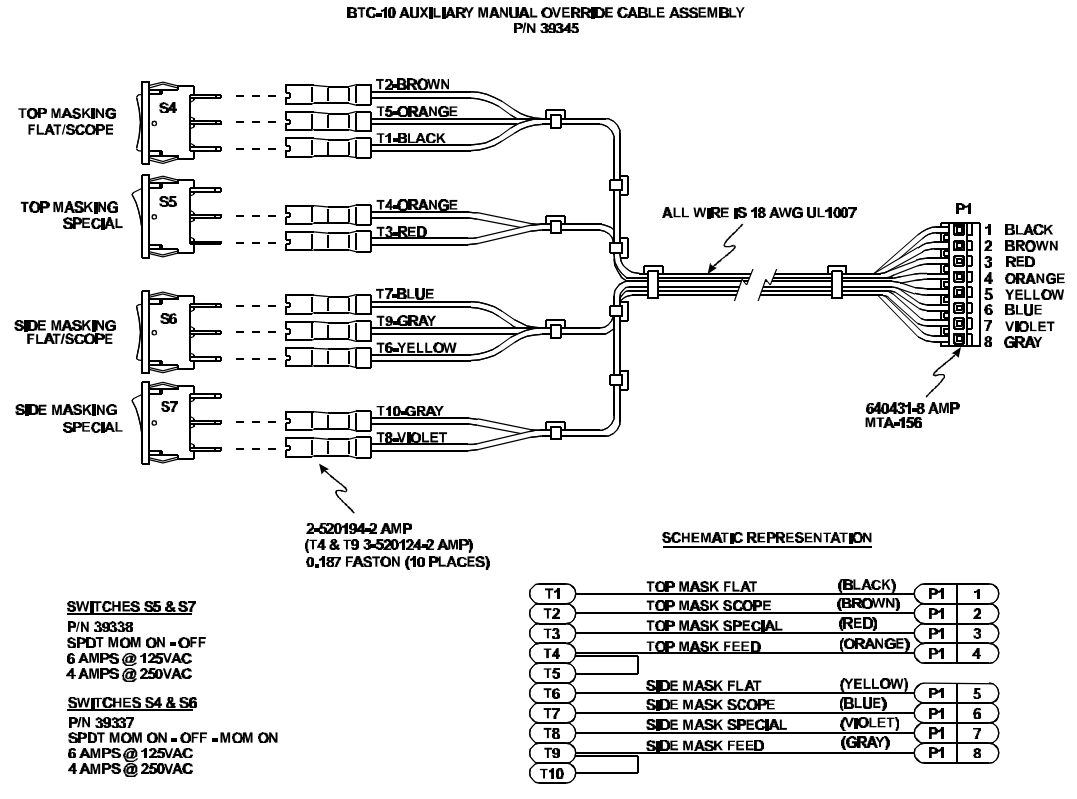
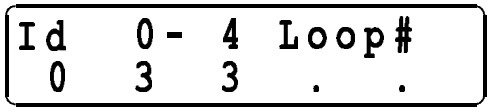

BTC-10 AUXILIARY MANUAL OVERRIDE CABLE ASSEMBLY
P/N 39345
TOP MASKING FLAT/SCOPE
S4
T2-BROWN
T5-ORANGE
T1-BLACK
TOP MASKING SPECIAL
S5
T4-ORANGE
T3-RED
SIDE MASKING FLAT/SCOPE
S6
T7-BLUE
T9-GRAY
T6-YELLOW
SIDE MASKING SPECIAL
S7
T10-GRAY
T8-VIOLET
ALL WIRE IS 18 AWG UL1007
P1
1 BLACK
2 BROWN
3 RED
4 ORANGE
5 YELLOW
6 BLUE
7 VIOLET
8 GRAY
640431-8 AMP
MTA-156
2-520194-2 AMP
(T4 & T9 3-520124-2 AMP)
0.187 FASTON (10 PLACES)
SCHEMATIC REPRESENTATION
T1 TOP MASK FLAT (BLACK) P1 1
T2 TOP MASK SCOPE (BROWN) P1 2
T3 TOP MASK SPECIAL (RED) P1 3
T4 TOP MASK FEED (ORANGE) P1 4
T5
T6 SIDE MASK FLAT (YELLOW) P1 5
T7 SIDE MASK SCOPE (BLUE) P1 6
T8 SIDE MASK SPECIAL (VIOLET) P1 7
T9 SIDE MASK FEED (GRAY) P1 8
T10
SWITCHES S5 & S7
P/N 39338
SPDT MOM ON - OFF
6 AMPS @ 125VAC
4 AMPS @ 250VAC
SWITCHES S4 & S6
P/N 39337
SPDT MOM ON - OFF - MOM ON
6 AMPS @ 125VAC
4 AMPS @ 250VAC

Figure 2.18

Checking the Network

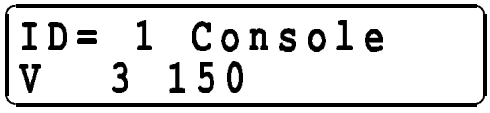
Once the CNAs are completely installed, it will be necessary to verify that all CNAs, Termination Panels and any other CineNet devices are communicating properly on their networks. The CNA-150 features two network status screens that display all devices on both the LSN and LIN networks.

From the CNA-150 front panel press: [MENU][2][1]. This is the LSN Status screen. This screen allows you to see all CNAs, Remote Monitors and Host PCs on the network. The first screen shows Ids 0 through 4 and the Sync Loop number for each.



The bottom line of the display shows the Sync Loop numbers for each Id. For example, if the bottom line shows: **0 3 3 . .**, Id 0 is the Host computer, Ids 1 and 2 are on sync loop 3, and Ids 3 and 4 are not responding. Scroll down to see more Ids. The next screen will show Ids 5 through 9 and so forth. Sync loop "**0**" indicates that the CNA is present and responding correctly, but is not enabled for sync. If a device (CNA, Host, etc) is not showing a loop number, be sure the device is powered up and the Id is set correctly.

Next, verify the LIN devices by pressing [MENU][2][2]. This is the LIN Status screen. This displays all I/O devices detected by the CNA and lists them in order of Id number. For example, the Console Termination Panel detected is Id number 1 and is running version 3 software, checksum 150.



Following is a list of I/O devices currently supported by the CNA-150.

ID=1	Console	:	Console Termination Panel #1
ID=2	Console	:	Console Termination Panel #2
ID=3	Booth	:	Booth Termination Panel
ID=4	Aux I/O	:	Auxiliary I/O Board #1
ID=5	Aux I/O	:	Auxiliary I/O Board #2

ID=6	Aux I/O	:	Auxiliary I/O Board #3
ID=7	Aux I/O	:	Auxiliary I/O Board #4
ID=8	MCD-35	:	Film Monitor and Cue Detector #1
ID=9	MCD-35	:	Film Monitor and Cue Detector #2
ID=10	ACP-50	:	Auxiliary Control Panel #1
ID=11	ACP-50	:	Auxiliary Control Panel #2
ID=12	RVC-10	:	Remote Volume Control (analog & digital)
ID=13	QDC-400	:	Quad Dimmer Control Board
ID=14	QDC-400	:	Quad Dimmer Control Board
ID=15	QDC-400	:	Quad Dimmer Control Board
ID=16	QDC-400	:	Quad Dimmer Control Board

Note: The Single Termination Panel P/N 39332 is reported as both a Console and Booth.

Section 3
SETUP

STOP - Please note at this point you should have completed the entire installation of the automation system. If you have not, go to the *Installation* section of the manual and complete it before proceeding.

Menu Structure

The CNA-150 currently allows configuration and set-up of cue learn, timed start, local and remote copy functions, system timers and the QDC-400 dimmer control board. There are also LSN and LIN status screens that are useful for verifying network devices and diagnosing network problems. The set-up screens are broken down into menus and sub-menus that make it easy to locate the desired parameter. The structure of the CNA-150 menu is shown below.

Main Run & Status Screen
- **Main Menu**
  - **1 Set-Up**
    - **1 Supervisory**
      - **1 CNA System ✻**
      - **2 Dimmer**
    - **2 Learn Times ✻**
  - **2 Network**
    - **1 LSN Status**
    - **2 LIN Status**
  - **3 Copy ✻**
    - **1 Network Copy ✻**
    - **2 Local Copy ✻**
  - **4 Control ✻**
    - **1 Start Mode ✻**
    - **4 Cue Learn Mode ✻**

✻ New in version 3.030

The menu is expanded showing all items. The editable parameters shown are factory defaults.

Main Run & Status Screen
- **Main Menu**
  - **1 Set-Up**
    - **1 Supervisory**
      - **1 CNA System ✻**
        - **Sound Changeover Delay (sec) 7**

Lens Changeover Delay (sec) 3
Lens Changeover Pulse (sec) .2
Failsafe Delay (sec) 2
Cue Factor Default .001 ✻
Cue Learn Mode Manual ✻
Timed Start Disabled ✻
Check Cue Fault Disabled ✻
Missed Cue Fault Disabled ✻
Rem Stop Alarm Time (sec) 10

2 Dimmer
Dimmer Ch1=House
Up 0% 0 sec
Down 0% 0 sec
Mid1 0% 0 sec
Mid2 0% 0 sec
Dimmer Ch2=Stage
Up 0% 0 sec
Down 0% 0 sec
Mid1 0% 0 sec
Mid2 0% 0 sec
Dimmer Ch3=None
Up 0% 0 sec
Down 0% 0 sec
Mid1 0% 0 sec
Mid2 0% 0 sec
Dimmer Ch4=None
Up 0% 0 sec
Down 0% 0 sec
Mid1 0% 0 sec
Mid2 0% 0 sec

2 Learn Times ✻
Program (1-9) ✻
Cue 1 Time 0:00 ✻
Cue 2 Time 0:00 ✻
Cue 3 Time 0:00 ✻
Cue 4 Time 0:00 ✻
Cue 5 Time 0:00 ✻
Cue 6 Time 0:00 ✻
Cue 7 Time 0:00 ✻
Cue 8 Time 0:00 ✻
Cue 9 Time 0:00 ✻

2 Network
1 LSN Status
Id 0- 4 Loop# . . . . .
Id 5- 9 Loop# . . . . .
Id 10-14 Loop# . . . . .
Id 15-19 Loop# . . . . .
Id 20-24 Loop# . . . . .
Id 25-29 Loop# . . . . .

Id 30-34 Loop# . . . . .
Id 35-39 Loop# . . . . .
Id 40-44 Loop# . . . . .
Id 45-49 Loop# . . . . .
Id 50-54 Loop# . . . . .
Id 55-59 Loop# . . . . .
Id 60-63 Loop# . . . .

2 LIN Status
ID=1 Console
ID=2 Console
ID=3 Booth
ID=4 Aux I/O
ID=5 Aux I/O
ID=6 Aux I/O
ID=7 Aux I/O
ID=8 MCD-35
ID=9 MCD-35
ID=10 ACP-50
ID=11 ACP-50
ID=12 RVC-10
ID=13 QDC-400
ID=14 QDC-400 ✻
ID=15 QDC-400 ✻
ID=16 QDC-400 ✻

3 Copy ✻
1 Network Copy ✻
Type of Data ✻
Supervisory Data ✻
Learn Times (1-9) ✻
Program (1-9) ✻
All Programs ✻
2 Local Copy ✻
Program (1-9, Default 1) ✻

4 Control ✻
1 Start Mode Manual ✻
2 Cue Learn Mode Learn ✻

✻ New in version 3.030

All menu items are proceeded with a number. If you know the number of the menu item that you want to access, you may use only the number keys. For example, to access the Local Copy function from the main run screen press [3][2] and enter the password. Knowing the number sequence to the most frequently used functions can save considerable time.

All menu items are proceeded with a number. If you know the number of the menu item that you want to access, you may use the number keys. For example, to access the Local Copy function from any screen press [MENU][3][2] and enter the password. Knowing the number sequence to the most frequently used functions can save considerable time.

Following are the number sequences to the most frequently used functions. This applies to version 3.030 and later.

CNA System	[MENU][1][1][1]	(Password Required)
Dimmer	[MENU][1][1][2]	(Password Required)
Learn Times	[MENU][1][2]	(Password Required)
LSN Status	[MENU][2][1]	
LIN Status	[MENU][2][2]	
Network Copy	[MENU][3][1]	(Password Required)
Local Copy	[MENU][3][2]	(Password Required)
Start Mode	[MENU][4][1]	
Cue Learn Mode	[MENU][4][2]	

Setup Supervisory

The first step in the setup procedure is to configure the CNA-150 system parameters. Supervisory is used to customize the operation of the CNA-150. The CNA System menu contains a set of system parameters used to set system delays, timers, and other global attributes. The Dimmer menu allows configuration of the QDC-400 dimmer.

CNA System

The list below summarizes the CNA System functions. Defaults are shown.

Sound Changeover Delay (sec)	**7**	
Lens Changeover Delay (sec)	**8**	
Lens Changeover Pulse (sec)	**.2**	
Failsafe Delay (sec)	**1**	
Cue Factor Default	**.001**	✻
Cue Learn Mode	**Manual**	✻
Timed Start	**Disabled**	✻
Check Cue Fault	**Disabled**	✻
Missed Cue Fault	**Disabled**	✻
Remote Stop Alarm Time (sec)	**30**	

✻ New in version 3.030

Output Configuration can only be changed from the Host program. The relay output defaults are shown in the table below.

Output	Contacts	Power-up	Fault-to
Lens:	**Pulsed**	**No-op**	**No-op**
Masking:	**Pulsed**	**No-op**	**No-op**
Sound:	**Pulsed**	**Non-sync**	**Non-sync**
House Lights:	**Pulsed**	**Up**	**Up**
Stage Lights:	**Pulsed**	**Up**	**Up**
Curtain:	**Pulsed**	**None**	**No-op**
Slide Projector:	**Maintained**	**On**	**On**
Out 1:	**Pulsed**	**No-op**	**No-op**
Out 2:	**Pulsed**	**No-op**	**No-op**
Out 3:	**Maintained**	**No-op**	**No-op**
Out 4:	**Maintained**	**No-op**	**No-op**

To enter CNA System , press [MENU][1][1][1]. At this point you will need to enter the password.

Sound Changeover Delay

The sound changeover delay determines the delay time between the show start input and the sound changeover from the *non-sync* music source.

For example, with the Sound C/O Delay set at 7, seven seconds after the show starts the changeover will open. And seven seconds after the last (end of show) cue is encountered the changeover will close. The legal range is 3 to 59 seconds. Enter data with the number keys.

Lens Changeover Delay

This represents the time required for the lens turret to change positions from flat to scope. It is the time the changeover will remain closed during lens changes. The result is a black screen. To determine the desired value, simply time the lens turret and add 1 second. The legal range is 0 to 9 seconds. 0 disables the function. Enter data with the number keys.

Lens Changeover Pulse

This setting controls the duration or width of the pulse sent to the changeover. It is recommended that the Changeover Pulse be set to the minimum value that allows the changeover to complete its full stroke. The legal values are .1 to 1.0 seconds. Enter data with the number keys.

Failsafe Delay

This function is a film *bobble* delay designed to prevent premature shutdown caused by platter or other types of rewind and film transport equipment during startup or any other portion of the presentation. Anytime the failsafe does not sense film presence during a presentation the Failsafe Delay timer is started, if film is detected before the timer expires, the presentation is not shutdown. If, however, film is not detected before the timer expires, the presentation is stopped and the alarm will sound. Legal entries range from 1 to 10 seconds. Enter data with the number keys.

Cue Factor Default

Note: Version 3.030 and later. This function is used in conjunction with CNA-150 *Cue Learn* system. The system learns the cue locations the first time a presentation is shown and places a "window", based on the Cue Factor number. In the event of a missed cue, the CNA-150 maintains the proper timing of events by automatically inserting a cue at the end of the window.

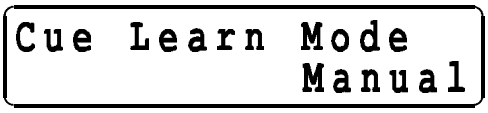
Simply put, the cue window time is the *Cue Factor* multiplied by the *Cue Time*. For example, if The Cue Factor Default is .001 and the cue occurs 50 minutes into the presentation, the size of the window is: .001 X 50 = .05 minutes or (.05 X 60) 3 seconds. Remember, the time of each window is based on the distance the cue is from the beginning of the film. So it follows that the further the cue is from the beginning of the film, the larger the window will be. Based on this, select a Cue Factor you can live with. For an average length movie, a Cue Factor Default setting of .002 is good.

Legal range is .001 to .999.

Note: For more information see *Cue Window Factor* see Cue Learn Mode in Section 4.

Cue Learn Mode

Note: Version 3.030 and later. This setting allows the Cue Learn Mode to be *manually* or *automatically* terminated at the end of the first presentation or *disabled*. In the Manual mode the operator is required to manually de-activate the Cue Learn Mode by pressing the Learn Mode key after the first presentation is completed. In the Auto mode the CNA-150 assumes that all cues were in their proper location and the presentation went as planned. At the end of the first presentation the CNA-150 will automatically de-activate the Cue Learn Mode. When Cue Learn Mode is disabled the operator is prevented from activating the "learned" mode. The entries are **Auto, Manual** and **Disabled**. Select the message with the [+] and [-] keys.

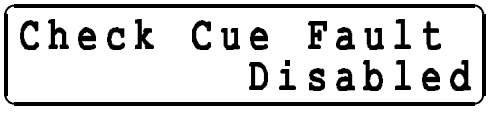


Timed Start

Note: Version 3.030 and later. This function controls access to the timed autostart function. The entries are **Enabled** and **Disabled**. When Timed Start is disabled the operator can not access the Time Start feature. Toggle the messages with the [+] and [-] keys.

Check Cue Fault

Note: Version 3.030 and later. When using the system Cue Learn mode feature there is a fault message that is displayed after running the presentation in *Learn* mode. The message **"CHECK CUE TIMES"** is displayed as a reminder to the operator to verify the cue times after the first show. This message can be suppressed by setting it to Disabled. This message is also suppressed if Cue Learn Mode is set to Disabled. Toggle the message with the [+] and [-] keys. See *Cue Learn Mode* in Section 4.



Missed Cue Fault

Note: Version 3.030 and later. When using the system Cue Learn mode feature there is a fault message that is displayed after running the presentation in *Learned* mode. For example, the message **"MISSED CUE 3"** will be displayed if the system did not see cue foil 3 during the show. This message can be suppressed for those theatres that do not use cue foil on the film, or for some other reason do not want to see this fault message. Toggle the message with the [+] and [-] keys. See *Cue Learn Mode* in Section 4.

Remote Stop Alarm Time

This function serves as a remote network alarm. When set to a non-zero time the alarm will pulse (for the programmed time) if another CNA automation on the network has faulted. Setting the time to 0 will disable this feature. Setting the time to 99 will sound the alarm until the alarm is canceled at the CNA that caused the fault or a Remote Monitor.

Additional CNA System Setup (Host Only)

Additional CNA-150 parameters may be configured from the Host program. You must have a host computer running the CineNet Host program and the PCI-64 Gateway Interface connected the LSN. Figure 3.1 shows version 1.007 of the CNA-100/150 Set-Up screen.

Relay outputs can be configured for pulsed or maintained, and fault-to and power-up conditions. You can also assign unused relays to the Out 1, Out 2, Out 3 and Out 4 controls. For example, if you are using the QDC-400 dimmer, there are 6 dimmer relays that will not be used. You may assign Out 1 to control the House Down relay and Out 2 to control the House Up relay. These outputs can then be programmed as part of a show. See the *Host Program Operators Manual* for further information.

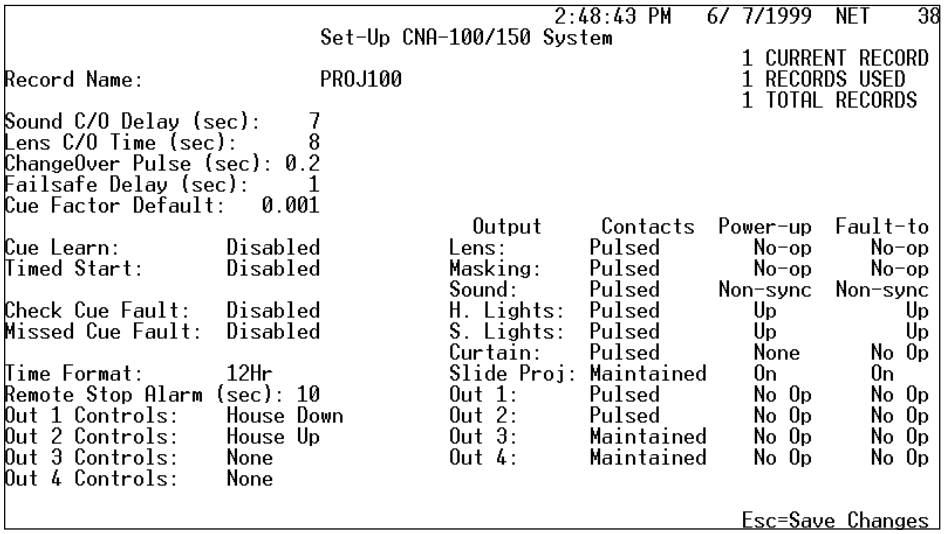


Figure 3.1

Setup Dimmer

The QDC-400 Dimmer Control Board is required for this procedure. The CNA-150 and QDC-400 Dimmer Control board allow the user to configure lighting scenes in minutes.

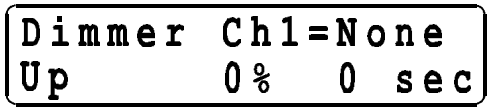
Note: Before beginning be sure the QDC-400 Control board, dimmer power modules and lights are wired and tested.

Enter the dimmer set-up screens by pressing [MENU][1][2] (or by pressing [MENU][ENTER][▼][ENTER]). Enter the password to gain access.

The QDC-400 is a four channel dimmer and each channel must be appropriately set to either “House”, “Stage” or “None”. *Note: Any additional selections are only used for light show programs, which can only be programmed from the Host computer.* How these are configured will be determined by the physical wiring of the dimmer power modules and lights.

With the cursor on the channel field the press [+] or [-] keys to select the appropriate light zone. Repeat this for all channels and exit dimmer set-up to save

zone data.



Re-enter dimmer set-up by pressing [MENU][1][2].

But, before programming the levels and fade-in times you need to understand how the CNA-150 controls the House and Stage light zones. There are four *House* light levels that can be programmed from the front panel: UP, MID 1, MID 2 and DOWN. The *Stage* lights operate with the House lights as follows:

When programmed for:	The lights do this:
UP	:House Lights UP; Stage Lights UP
MID 1	:House Lights MID 1; Stage Lights DOWN
MID 2	:House Lights MID 2
DOWN	:House Lights DOWN;Stage Lights DOWN

A typical program might look like the following example:

Movie:	Program:	Lights:
Intermission	:UP	:House UP; Stage UP
Previews	:MID 1	:House MID 1; Stage DOWN
Feature	:DOWN	:House DOWN; Stage DOWN
Credits	:MID 2	:House MID 2
Intermission	:UP	:House UP; Stage UP

Based on the example above you could program the levels as follows:

House UP	= 80%	10 seconds
House MID 1	= 40%	10 seconds
House MID 2	= 40%	10 seconds
House DOWN	= 10%	10 seconds
Stage UP	=100%	10 seconds
Stage DOWN	= 0%	10 seconds

Note: You can ignore the Stage MID 1 and MID 2 levels. The CNA-150 does not

currently use them.

See the *QDC-400 Dimmer Controller* manual for more detail on installing and setting up the dimmer.

Setup Learn Times

Note: Version 3.030 and later. Each time a program is executed the computer stores each cue time in memory. If the CNA-150 was in *cue learn mode* when the show ended the values for the cue times are saved to a table in *battery-backed* memory. The values in this table can be viewed and edited. A program can store up to nine cue times. Access is granted with the password. To access the cue times from the main screen, press [MENU][1][2] and enter the password.

Enter the program number you want to view and press [ENTER].

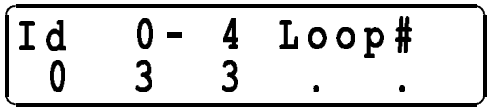
Now you are viewing the *cue learn times* for the program.

At this time you may enter or edit the cue learn times by using the number keys. Press the cursor keys or [ENTER] to move to different learn time fields. The learn times are displayed in minutes and seconds. The maximum value that can be entered is 999 minutes 59 seconds (equivalent to 16 hours 39 minutes and 59 seconds). Press the [CLEAR] key to reset the cue time to 0:00. Clear all cue times which are not being used. **Verify upon completion that all cue times are arranged in chronological ascending order.**

Network Status

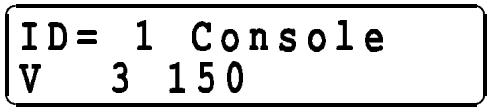
The CNA-150 features two network status screens that display all devices on both the LSN and LIN networks.

From the CNA-150 front panel press: [MENU][2][1]. This is the LSN Status screen. This screen allows you to see all CNAs, Remote Monitors and Host PCs on the network. The first screen shows Ids 0 through 4 and the Sync Loop number for each.



The bottom line of the display shows the Sync Loop numbers for each Id. For example, if the bottom line shows: **0 3 3 . .**, Id 0 is the Host computer, Ids 1 and 2 are on sync loop 3, and Ids 3 and 4 are not responding. Scroll down to see more Ids. The next screen will show Ids 5 through 9 and so forth. Sync loop "**0**" indicates that the CNA is present and responding correctly, but is not enabled for sync.

Enter the LIN Status screen by pressing [MENU][2][2]. This displays all I/O devices detected by the CNA and lists them in order of Id number. For example, the Console Termination Panel detected is Id number 1 and is running version 3 software, checksum 150.



There are three fault messages that can be displayed to indicate a problem. The messages are:

DevErr
Commerr
TimeOut

"DevErr" indicates that the CNA-150 does not recognize the remote device. This could be due to software version incompatibility. "CommErr" indicates that the remote device is not responding regularly. This could be due to a defective remote

device or the wiring to it. "TimeOut" indicates a communication timeout condition, meaning that the remote device stopped responding after 5 seconds.

Any of these faults will cause a "LIN: NETWORK FLT" message to be displayed on the top line of the display. Correct the problem and press the ALARM CANCEL key to clear message.

Following is a list of I/O devices currently supported by the CNA-150.

ID=1	Console	:	Console Termination Panel #1
ID=2	Console	:	Console Termination Panel #2
ID=3	Booth	:	Booth Termination Panel
ID=4	Aux I/O	:	Auxiliary I/O Board #1
ID=5	Aux I/O	:	Auxiliary I/O Board #2
ID=6	Aux I/O	:	Auxiliary I/O Board #3
ID=7	Aux I/O	:	Auxiliary I/O Board #4
ID=8	MCD-35	:	Film Monitor and Cue Detector #1
ID=9	MCD-35	:	Film Monitor and Cue Detector #2
ID=10	ACP-50	:	Auxiliary Control Panel #1
ID=11	ACP-50	:	Auxiliary Control Panel #2
ID=12	RVC-10	:	Remote Volume Control (analog & digital)
ID=13	QDC-400	:	Quad Dimmer Control Board
ID=14	QDC-400	:	Quad Dimmer Control Board
ID=15	QDC-400	:	Quad Dimmer Control Board
ID=16	QDC-400	:	Quad Dimmer Control Board

Note: The Single Termination Panel P/N 39332 is reported as both a Console and Booth.

Copy

Note: Version 3.030 and later.

The Copy function can be used to copy Programs or Supervisory data from another CNA-150. The copy function provides the option for a *Local* copy or a *Network* copy.

Local Copy is used to copy a Program from one location to another. For instance, you may want to copy Program #4 to Program #2 and edit it instead of starting a new program.

Network Copy is used to copy Programs or Supervisory data from a *remote* CNA-150. This further reduces the amount of data entry, particulary in large multiplexes. Using Network Copy you can only copy program data *from* a remote CNA-150 to the CNA-150 that is performing the copy. You are prohibited from copying *to* a remote CNA-150.

Network Copy

To access the Network Copy screen press [MENU][3][1] and enter the password. The screen will prompt you to select the type of data you want to copy.

Scroll to the type of data you want to copy using the [+] and [-] keys. Below is a list of data types the CNA-150 can copy.

Supervisory Data
Learn Times 1 through 9
Programs 1 through 9
All Programs

Press [ENTER] and you are prompted to select a source Id. Select a valid Id number and press [ENTER].

Press [ENTER] again to perform the copy. The screen will display the data transfer status screen.

If the copy was successful, the screen will indicate this with a “Network Copy Complete” message. To perform another copy press any key (except for the [MENU] or [HOME] keys).

Local Copy

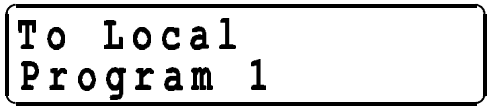
To access the Local Copy screen press [MENU][3][2] and enter the password. The screen will prompt you to select the program number you want to copy.

“Default 1" is a canned program that can be copied to any other program. The Default 1 program is as follows:

Cue 1-8: Sound - Non-Sync
Lights - Up
Lens & Masking - Flat

Cue 9: Sound - Non-Sync
Lights - Up
Lens & Masking - Flat
Show End

Scroll to the “source” program using the [+] and [-] keys and press [ENTER].



Scroll to the “target” program using the [+] and [-] keys and press [ENTER] again. Press [ENTER] one more time to perform the copy. If the copy was successful, the screen will indicate this with a “Local Copy Complete” message. To perform another copy press any key (except for the [MENU] or [HOME] keys).

Control

Note: Version 3.030 and later.

This menu item contains special Control Modes for the CNA-150.

Start Mode allows the user to select either a Manual or Timed start. To select a start mode press [MENU][4][1].

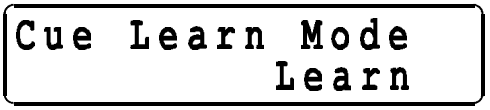
Press the [+] or [-] key to toggle between the "Manual" and "Timed" messages. Press [ENTER] to activate the start mode. When timed start is activated, the user is prompted to enter a time.

Enter a time with the number keys (minutes:seconds). Press [ENTER] to start the timer.

If Timed start is disabled in Supervisory, the operator is prevented from activating the Timed start mode.

The CNA-150 can either "learn" cues or use "learned" cues. When the CNA-150 is running a show in learned mode, it is using the cue times stored for that program. If the CNA-150 is running a show in learn mode, it is saving cue times for that program.

To select the Cue Learn Mode, press [MENU][4][2].

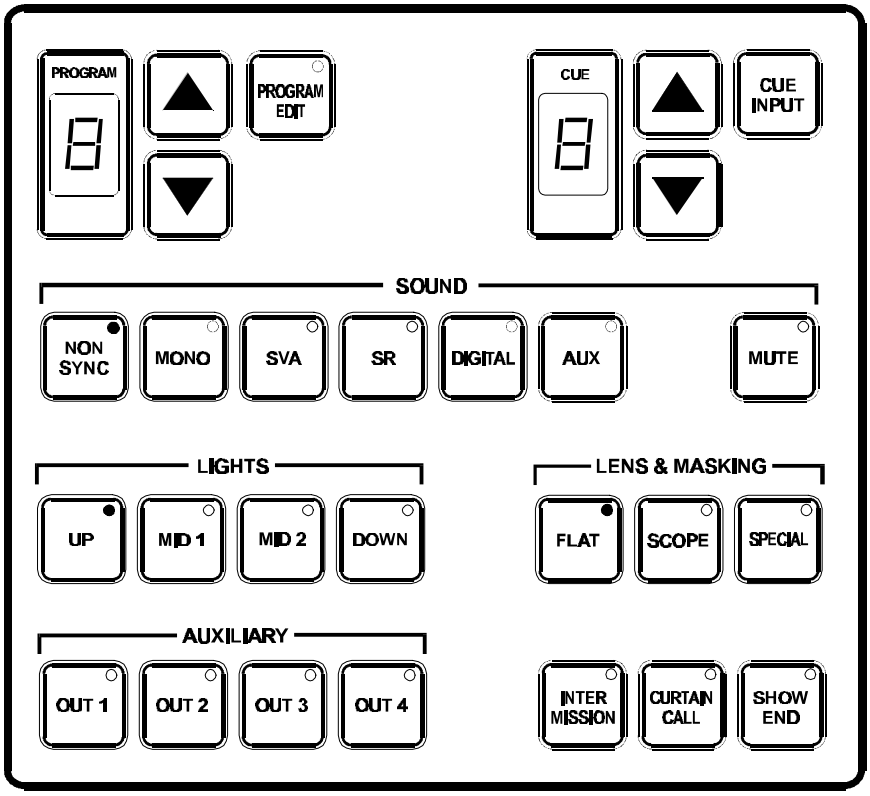


The [+] and [-] keys will select either "Learn" or "Learned" mode. Press [ENTER] to activate the cue learn mode. In learn mode an "L" will appear on the right side of the bottom line of the display.

If Cue Learn Mode is disabled in Supervisory, the operator is prevented from using the “learned” mode.

Programming the CNA-150

The CNA-150 is a *single cue* automation. This means that events, such as lens, masking and sound changes, are initiated by a cue (normally foil placed on the film). These events are stored in the CNA-150's memory and are called *programs*. The CNA-150 gives the user the ability to build and store up to nine different programs. Each Program can use up to nine cues. Programming is accomplished with the *Programming* keys and the *Program* and *Cue* numbers.



The following steps describe how to edit a program:

1. Press the PROGRAM EDIT key to activate the *edit mode*. The PROGRAM EDIT LED will toggle "on". The CUE up and down arrow keys are enabled and the PROGRAM and CUE displays will stop blinking *if* show is in progress.

2. Select the program to edit with the PROGRAM up or down arrow keys.

3. Program the Sound, Lens and Lights for each cue, starting at Cue 0, using the

programming keys. Program the Auxiliary outputs (OUT 1 through OUT 4) if an 'Aux Board' is connected to the system or they are re-assigned to unused relays. (Note: This can only be done via the Host program. See the Set-up Supervisory section of this manual and *Host Program Operators Manual* for more information.) One or more of these outputs can be on at a time.

Note: Cue 0 is the *program start* cue. Cue 0 occurs at the "start" when *not* running in Sync mode and occurs at the "sync cue" when running in Sync mode. So, when programming remember Cue 0 is the first step of the program.

4. Use the SHOW END key to indicate the end of the program.

5. Select a different program to edit or press the PROGRAM EDIT key to de-activate *edit mode*. The PROGRAM EDIT LED will toggle "off". The PROGRAM number and CUE number *up* and *down* arrow keys will be disabled and the displays will slowly blink if the show is in progress.

Following are some simple rules to remember when programming:

Programming a SHOW END cue locks out subsequent cue numbers, keeping you from scrolling to a larger cue number.

You may edit any program while a show is in progress.

You may edit the program that is running, but you cannot change the number of cues.

When a show is in progress and you are *not* in the PROGRAM EDIT mode the PROGRAM and CUE number *up* and *down* arrow keys are disabled.

The LEDs on the programming keys reflect the program that is running, and do not show delays that effect the actual outputs.

The INTERMISSION and CURTAIN CALL Keys

These are two special programming keys that allow the user to easily program a Show Intermission and a Curtain Call. The INTERMISSION key is used to program a show intermission at the selected cue. The cue then initiates the intermission sequence as follows:

Changeover Close
Lights
Sound
Curtain Close
---
7 second delay

Xenon Lamp Off
Projector Motor Off
Slide Projector On

The Intermission is terminated and the show is re-started either by a START input (remote or local) or a CUE input (remote or local). If the show is re-started by a START input, only the projector motor and lamp are turned on. The next film cue will initiate the show start sequence. The show start sequence is as follows:

START

Xenon Lamp On
Projector Motor On

Cue n

Lens/Masking
Lights
Curtain Open
---
7 second delay

Slide Projector Off
---
1 second delay

Changeover Open
Sound

If the show is re-started with a CUE input, there is *no* need for a show start cue. The show start sequence is as follows:

CUE

Xenon Lamp On
Projector Motor On
Lens/Masking
Lights
Curtain Open
---
7 second delay

Slide Projector Off
---
1 second delay

Changeover Open
Sound

The "Curtain Call" function will issue a curtain *close* at a selected cue. For example, suppose you wanted your curtains to close and the end of your trailers and open back up at the start of your feature presentation. You would place a cue at a distance before the end of the trailer that is equal to the curtain close time and another cue at the beginning of the feature. The sequence of events are as follows:

Cue n (with Curtain Call)

Curtain Close
Sound (if programmed)
Lights (if programmed)

Cue n+1

Lens/Masking
Changeover Close
Lights
Curtain Open
---
7 second delay

Changeover Open
Sound

Section 4
OPERATION

Operating the CNA-150

In the "Ready to Run" state, the FILM PRESENCE LED will be "off", and the START LED will be blinking. Select the program 1 through 9, that you want to run with the up/down arrow keys. Press the START switch to start the show. The START LED will toggle "on".

When a show is running, the current states of the Sound, Lens, Lights and Auxiliary will be shown with the LEDs "on". The cue number displayed is the next cue the CNA-150 is waiting to see.

Soft Manual Overrides & LEDs

During run mode, pressing any of the Sound, Lens, Lights or Auxiliary keys will drive the output to that state. Note: This will not alter the saved program. At the next cue the program will override any manual changes.

The LEDs on the override keys reflect the program that is running, and do not show delays that effect the actual outputs.

"Next State" feature

Data entry key LEDs show the "next state" of the program. This feature allows the user to see the next programmed instruction without entering the Program Edit mode. The 3 conditions that can be observed from the switch LEDs are:

a) LED On - This is the current state and the next state.

b) LED On 1.8 sec : Off 0.1 sec - This is the current state; the next state is something else (including the *none** state).

c) LED On 0.1 sec : Off 1.8 sec - This is the next state.

* The "none" state is when none of the keys are programmed. This is not yet possible for the sound, lens & masking, and lights, but someday may be.

Check Focus Alarm

Note: Check Focus Alarm is supported in version 3.030 and later

The Check Focus feature alerts the operator that the show is about to start. In Timed Start the alarm will begin to sound 7 seconds prior to the show starting. This gives the operator time to make any quick adjustments and to insure the image on the screen is in focus.

Cue Learn Function

Note: Cue Learn is supported in version 3.030 and later.

The CNA-150 incorporates *cue learn* mode in which cues times for each program “learned” (or stored in memory). On subsequent runs the CNA-150 expects to see the film cues at a particular time. If a cue is not seen, due to a missing or worn cue foil, the CNA will automatically "issue" a cue which will advance the program and keep the show running properly. Cue Learn also makes it possible to operate a show without film cue foil at all!

Cue Learn is activated by the operator prior to running a film for the first time or after any change is made to the film itself (adding, deleting or moving cues). Using the internal clock, the CNA-150 will "learn" the cue times. After learning cue times all subsequent presentations will be run in the "learned" mode. The CNA-150 will expect to encounter these cues at particular times. If film cues are not encountered within a specified "window", the system will automatically “insert” a cue allowing the program to carry out the next set of instructions. If any of the film cues are missed during a presentation an error message will be displayed at the end the show indicating which cues were missed. The size of the "window" is defined by the Cue Factor Default function in the Supervisory. Note that the Cue Input key on the control panel is always active. Cues can be input manually using the Cue Input key, or foil cues on the film can be sensed by the cue detector.

The Cue Learn function in the Supervisory can be set to Auto, Manual or Disabled. In the Auto mode Cue learn is automatically switched to “learned” after the first run of the program, after which all subsequent runs will be in the "learned" mode. In the Manual mode Cue Learn must be disabled manually by pressing the Cue Learn key. When set for disabled the cue learn function is not accessible.

Cue Window Factor

The Cue Window Factor is a function of the cue times measured. Briefly, in Cue Learn Mode, the system measures the cue times produced using the film cue foils. Thereafter, if cues are missing, the system automatically supplies them. The width of the window is calculated using the Cue Window Factor and is *centered* around the normal cue time. Using this system, the projectionist does not have to be concerned about any missing or errant cues, once cues have been learned.

The cue window is calculated to be sufficiently wide to accommodate any timing variations due to changes in motor speed caused by power line voltage or frequency fluctuations.

The Cue Window is calculated by the following equation:

Cue Window = (CWF value) x (cue location)

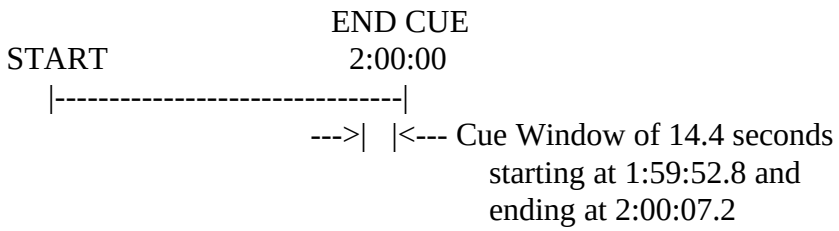
EXAMPLE: CWF value = 0.002, cue location = 2 hours

Cue Window = 0.002 x 2 hours or 120 minutes or 7200 seconds

Cue Window = 0.004 hours = .24 minutes = 14.4 seconds

The Cue Window would be interpreted as follows. With a CWF value of 0.002, the CNA-150 would memorize the cue locations and wrap them in a 0.002 window. If an end cue was sensed at the 2 hour mark, the window would be 2:00:00 +/- 7.2 seconds for a total window of 14.4 seconds.

Illustrated it would look like this:



Given a normal 2 hour presentation with four cues, we could establish a table indicating their respective time locations.

Name	Cue	Time from Start
Trailer	1	0:02:15
Show	2	0:06:32
Credits	3	1:48:26
End	4	2:00:00

Utilizing the same CWF value for each cue, the CNA-150 would construct a cue window table.

			Cue Window		
Name	Cue	Time from Start	Start	End	Size
Trailer	1	0:02:15	0:02:15	0:02:15	0.3 sec.
Show	2	0:06:32	0:06:31	0:06:33	0.8 sec.
Credits	3	1:48:26	1:48:13	1:48:39	13.0 sec.
End	4	2:00:00	1:59:53	2:00:07	14.4 sec.

Under normal conditions the CNA-150 will only recognize cues within the four established windows. If none are sensed it automatically inserts one at the end of a window which maintains your professional presentation. If cues are sensed outside the windows, they are assumed false and ignored.

The value of the cue window factor is determined by analyzing your local utility company's power fluctuations. This is done with the CNA-150. Simply keep the unit in the Cue Learn Mode for several days. After each presentation of the same show, record the cue values displayed in the Cue Learn setup screen.

To analyze the values, determine the maximum fluctuation in overall run time.

EXAMPLE:

LEARNED CUE VALUES

Cue	Show 1	Show 2	Show 3	Show 4	etc.
Cue 1	0:01:00	0:01:00	0:01:01	0:01:01	----------
Cue 2	0:04:00	0:04:00	0:04:01	0:04:01	----------
Cue 3	1:45:00	1:45:14	1:45:08	1:45:34	----------
Cue 4	1:55:00	1:55:16	1:55:09	1:55:36	----------

The widest fluctuation would be between shows 1 and 4. To estimate the CWF value, calculate the average fluctuation in run time by simply subtracting the low overall run time from the high overall run time (1:55:36 minus 1:55:00) and divide by 2. Then divide this number by the average run time [(1:55:36 + 1:55:00) divided by 2].

The result is as follows:

Average fluctuation = (HIGH VALUE - LOW VALUE) divided 2
= (1:55:36 - 1:55:00) divided by 2
= (0:00:36) divided by 2
= 18 seconds

The average run time is simply calculated as follows:

Average run time = (HIGH VALUE + LOW VALUE) divided by 2
= (1:55:36 + 1:55:00) divided by 2
= 3:50:36 divided by 2
= 1:55:18 or 1 hour, 55 minutes and 18 seconds

The deviation is calculated as follows:

Deviation = AVERAGE FLUCTUATION/AVERAGE RUN TIME
= 0:00:18/1:55:18 (convert to seconds)
= 18 seconds/6918 seconds
= .002602

Your Cue Window Factor should not be less than the deviation. In our example the Cue Window Factor should not be less than 0.003.

We recommend adding 0.002 to the calculated three digit value. In our example the value in three digits is 0.005. A logical CWF should be 0.005.

The CWF value of 0.005 is logical in light of actual conditions. If you find lights coming up early at credits, you may wish to open the credit window up with a larger value. Remember, every 0.001 equals an increase in the window size of 3.6 seconds for every hour of movie length.

Our investigation indicates that power fluctuations normally represent a speed fluctuation of less than 0.1 percent (CWF value of less than 0.002).

Synchronous Operation

The CNA-150 systems are capable of running film synchronously in a multi-projector booth. The CNA-150 can be programmed for any one of nine sync loops. This allows for up to nine different sync loops on the network at one time. Pressing the SYNC key will activate the sync operation and disable the up/down arrow keys. (This prevents the machine from joining another sync loop that is running and causing a fault on those machines when it drops off the loop.) To change the SYNC LOOP number, press the SYNC switch to deactivate. Set the loop number with the up and down arrow keys and press the SYNC switch again to activate. The LED on the SYNC switch indicates whether sync mode is active.

To run in sync the following conditions must be true:

1. A *sync cue* must be added to the beginning of the film. This is the first cue that is seen by the automation. It acts to initiate the start up sequence for each machine.

2. Sync Mode on each automation in the loop must be enabled.

3. The sync loop number on each automation in the loop must be the same.

To begin a movie, insure that the sync cue is positioned somewhere before the cue detector on the first machine. Press the [START] switch on any machine in the loop. All projectors will start simultaneously. As the sync cue passes through each projector, the show start sequence will initiate.

At the end of the show each machine will shut down independently as the tail of the film runs out of the projector. On endless loop systems all projectors will continue to run until the last machine see the end cue. At that time all projectors will shut down simultaneously.

System Status Messages

The CNA-150 contains a list of status messages that can be displayed due to various internal or external conditions. Most of these messages displayed indicate system faults. There are also some internal power up and reset diagnostic messages, most of which will not and should not be displayed under normal operating conditions.

Fault Condition Messages

The Fault Condition messages can be divided into three categories: Internal *Memory* faults, *Local* faults and *Network* faults.

Memory Faults

The internal memory faults are generated when there is a "checksum" error. Briefly, a checksum is an arithmetic sum of the contents of memory that is stored in the memory itself and is re-computed and checked each time the CNA-150 is powered up.

Program Memory Fault

Each of the Programs (1 through 9) have a checksum. The Program Memory Faults are indicated on the LCD display screen.

The Program Memory Faults are also displayed and "blinked" rapidly on the three LED displays.

Message	Description
P 0 1	Program 1 Checksum Fault
P 0 2	Program 2 Checksum Fault
P 0 3	Program 3 Checksum Fault
P 0 4	Program 4 Checksum Fault
P 0 5	Program 5 Checksum Fault

P 0 6	Program 6 Checksum Fault
P 0 7	Program 7 Checksum Fault
P 0 8	Program 8 Checksum Fault
P 0 9	Program 9 Checksum Fault

If any of the *Program* memory faults are displayed on power up, *clear* the fault by pressing the ALARM CANCEL key. Press the PROGRAM EDIT key to enter the edit mode. Cursor to the program that has the checksum error. Scroll through the program to verify that it has not changed. If all the steps look okay, press any key to re-calculate the checksum. Press the PROGRAM EDIT key again and cycle power to verify that there is no other checksum errors.

Set-Up Parameters Memory Fault

A *Set-Up Parameters* memory fault will be displayed if there is a checksum error.

LCD display screen message:

LED Display message:

Message	Description
P A r	Set-Up Parameters Checksum Fault

If any of the *Set-Up Parameters* memory faults are displayed on power up, *clear* the fault by pressing the ALARM CANCEL key. Enter the Set-Up menu and verify all data. Correct any data errors and press the HOME key to re-calculate the checksum. Cycle power to verify that there is no other checksum errors.

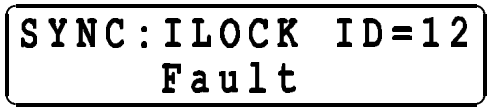
Synchronous Interlock Faults

Synchronous Interlock faults alert the operator that a problem exists with a CNA on the sync loop. These faults will either stop the show and sound the alarm or prevent a show from starting.

A **Local Sync Interlock Fault** is caused when either a master or one of the slaves in the sync loop has lost it's sync input (sync switch). All CNA-150s on the sync loop will display "L S I" on the LED displays and sound their alarms. This message will also be displayed if one of the units on the loop had a "watchdog reset". If this was the case, all units will display this message except for the one that had the watchdog reset.

LED Message: **L S I**

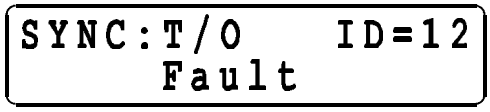
LCD Message:



A **Local Sync Communications Timeout Fault** is caused when there is a loss of communications with a unit on the sync loop. This could be due to a loss of power of the master or one of the slaves on the loop. In this case all units on the sync loop would display "L S C" except for the one that lost its power. This fault can also be caused by defective wiring, such as an open or short on the LSN communications link.

LED Message: **L S C**

LCD Message:



These next three faults indicate that the master or one of the slave CNA-150s is preventing the interlock loop from *starting* or *resuming* a show. The LED message is the same for these faults, but the LCD message is more descriptive.

The **Not Ready To Resume Fault** indicates that the automation cannot start a show because a least one of the CNA-150 remotes are not in the "Ready to Resume" condition.

LED Message: **L S r**

LCD Message:

```
SYNC:RES    ID=12
     Fault
```

The **Need Master To Resume Fault** indicates that there is no master. The master may be lost if the communication wires are disconnected, power is lost or the sync input (sync switch) is not enabled at the master.

LED Message: **L S r**

LCD Message:

```
SYNC:NO MASTER
     Fault
```

The **Not Ready To Run Fault** indicates that the automation cannot start a show because a least one of the CNA-150 remotes are not in the "Ready to Run" condition

LED Message: **L S r**

LCD Message:

```
SYNC:RUN    ID=12
     Fault
```

The **Sync Remote Stop Fault** indicates a fault on a remote CNA when interlocked. The Sync Loop number will blink. Correct the problem to clear the message.

```
SYNC:REMOTE STOP
     Fault
```

Local Faults

The **Local I/O Network Fault** is caused due to a loss in communications with a Local I/O Network device or another network problem. This could be the Booth Termination Panel, Console Termination Panel or other I/O Network device or a wiring problem.

A Local I/O Network fault will cause the CNA-150 to display "L I n". This fault will cause a shutdown during a show or prevent a show start between shows. This fault is latched and you are required to press the ALARM CANCEL key to clear the fault. Although this will cancel the fault and allow a show to start, there is a problem with the Local I/O Network or one of the devices and it must be repaired.

LED Message: **L I n**

LCD Message:

The **Film Failsafe Fault** indicates that the film failsafe does not sense film presence or the film tension is excessive. Correct the problem to clear the message.

The **Film Motion Fault** indicates that the film motion sensing device did not detect the proper film speed after 2 seconds. Press the ALARM CANCEL key to cancel the alarm.

Press the ALARM CANCEL key again to clear the fault message.

This fault indicates that the xenon lamp failed to light after 10 seconds. Press the ALARM CANCEL key to clear the message.

Status Messages

CNA-150 status messages notify the operator that a particular action needs to be performed. The network start and stop messages let the operator know that a start or stop input is asserted either at a remote control station on the LSN or LIN.

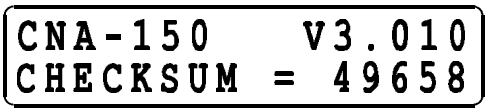
This is the **Remote Alarm** status screen. This message indicates that a Fault-Alarm condition exists at a remote CNA-150, where the number is the CNA Id number.

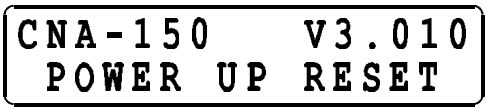
The **Faults Defeated** message serves as reminder to the operator that the Film Presence, Film Motion, Film Tension and Xenon Faults are bypassed. Press the FAULT DEFEAT key to toggle this function on or off.

The **Low Battery Fault** indicates that the battery has gone below a pre-determined threshold voltage during a power down condition. If this message is displayed along with any memory fault messages, the low battery condition probably caused the other memory fault(s).

Power Up Messages

The CNA-150 will display two messages at a normal power up. The software version number, checksum number and type of reset will be displayed.





Timing Diagrams for the CNA-150

The following Timing Diagrams show timer values, output configurations and cue events for all the outputs. These timing diagrams can be extremely useful to help understand the operation and capabilities of the CNA-150. The first timing diagram shows the "Standard Operation" from power up to show end. Standard Operation implies a running a program with no interruptions (stop or faults) or special effects (curtain call or intermission). The defaults for each outputs are indicated in the last column of the timing diagram. Default timer values and pulse durations are indicated in the bottom margin of the timing diagram. The diagram indicates automatic and programmed outputs.

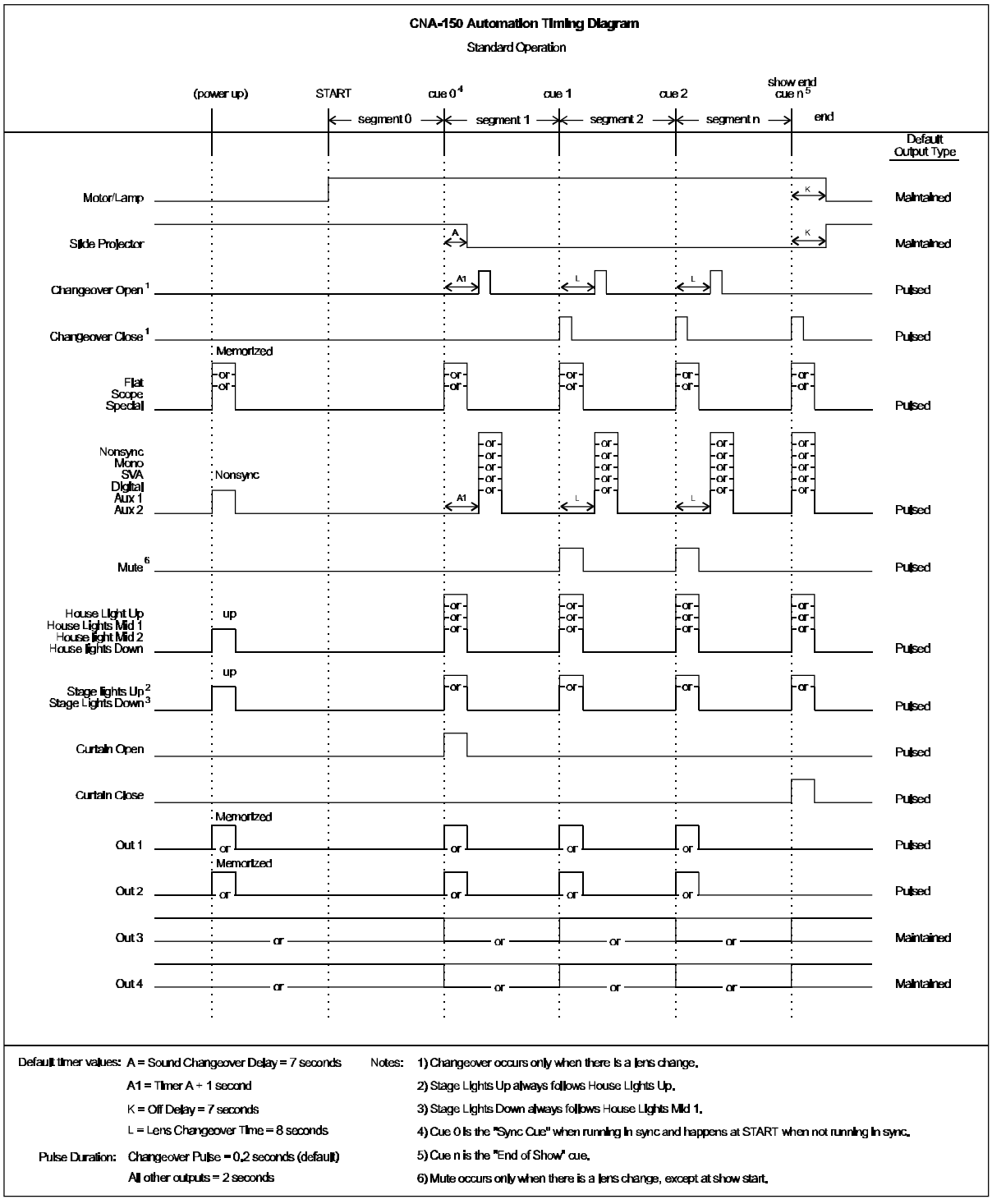
The second timing diagram shows the Fault/Stop Shutdown and Restart Sequence. The area of interest is the shaded portion of the diagram. This shows the default 'Fault-to' conditions:

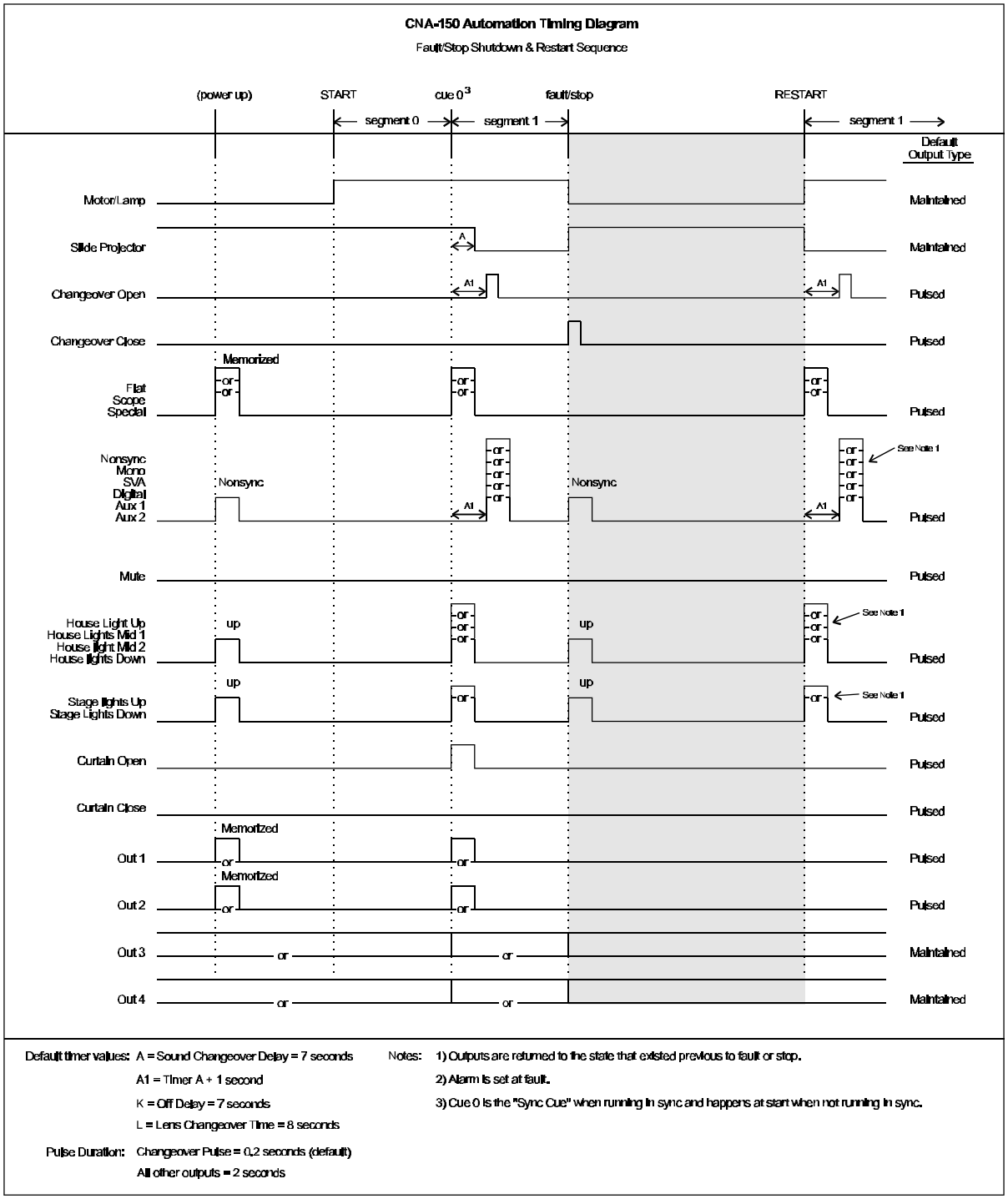
Projector Motor and Lamp = OFF
Slide Projector = ON
Changeover = CLOSE
Sound = NON-SYNC
House Lights = UP
Stage Lights = UP

These default conditions can be configured in the CNA-150 Set-up Supervisory section of the Host PC Program.

The third timing diagram shows the Intermission Stop Sequence. The area of interest is the shaded portion of the diagram. At the Intermission cue the Changeover and Curtain will close. Seven seconds later the Projector Motor will shut off and the Slide Projector will turn on. Sound, Lights and Out 1, 2, 3, and 4 can be programmed for any state during the intermission. A Restart will start the Projector Motor and a film cue will initiate the show start sequence.

The fourth and last timing diagrams show the Curtain Call Sequence. The area of interest is the shaded portion of the diagram. The 'curtain close time' is determined by the distance between the curtain call cue and the next film cue. Sound, Lights and Out 1, 2, 3, and 4 can be programmed for any state during the Curtain Call.

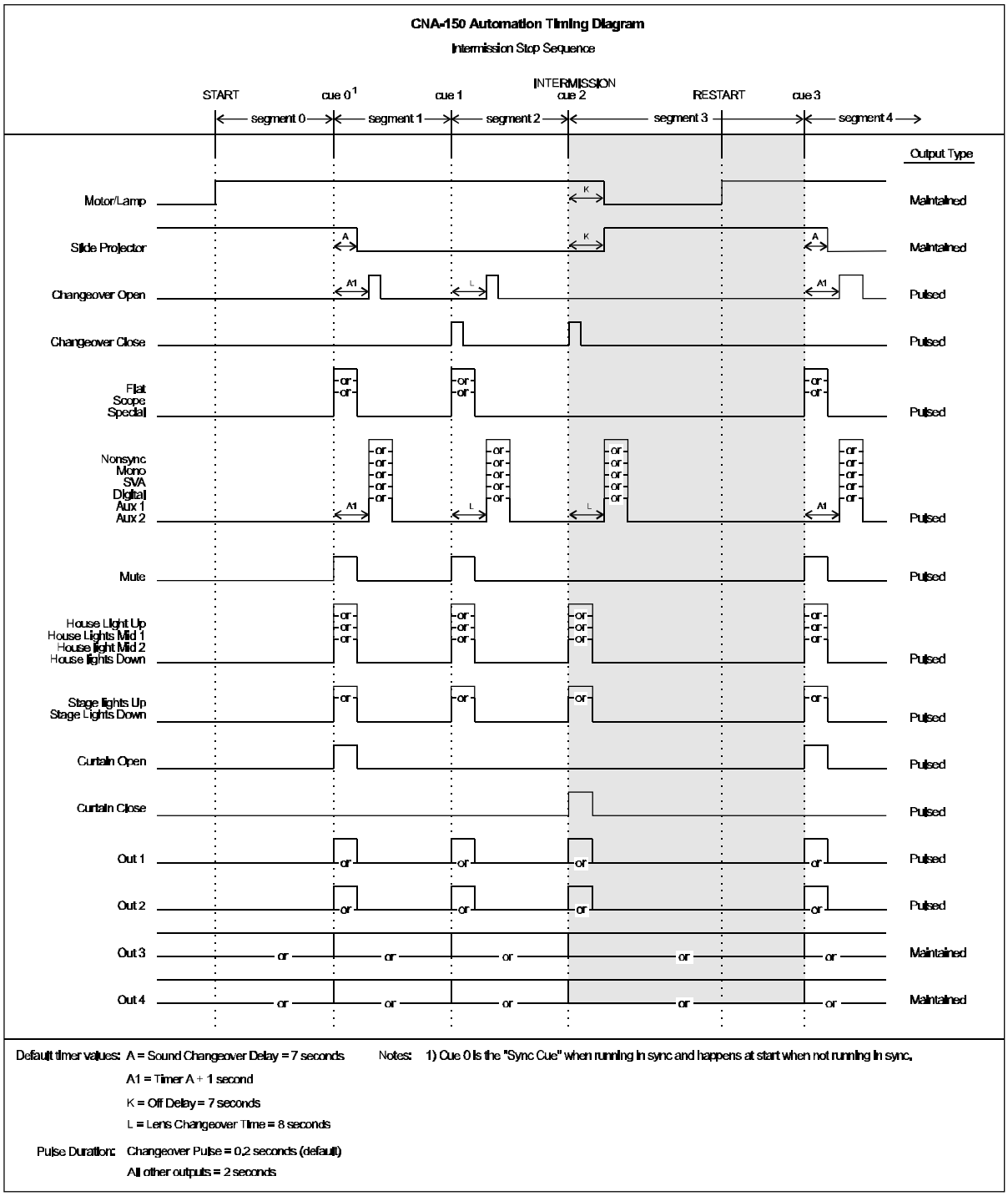

CNA-150 Automation Timing Diagram
Standard Operation
(power up)
START
cue 0 4
cue 1
cue 2
show end
cue n 5
segment 0
segment 1
segment 2
segment n
end
Default Output Type
Motor/Lamp
Slide Projector
Changeover Open 1
Changeover Close 1
Flat
Scope
Special
Nonsync
Mono
SVA
Digital
Aux 1
Aux 2
Mute 6
House Light Up
House Lights Mid 1
House light Mid 2
House lights Down
Stage lights Up 2
Stage Lights Down 3
Curtain Open
Curtain Close
Out 1
Out 2
Out 3
Out 4
Memorized
Nonsync
up
A
A1
L
K
or
Maintained
Pulsed
Default timer values: A = Sound Changeover Delay = 7 seconds
A1 = Timer A + 1 second
K = Off Delay = 7 seconds
L = Lens Changeover Time = 8 seconds
Pulse Duration: Changeover Pulse = 0.2 seconds (default)
All other outputs = 2 seconds
Notes: 1) Changeover occurs only when there is a lens change.
2) Stage Lights Up always follows House Lights Up.
3) Stage Lights Down always follows House Lights Mid 1.
4) Cue 0 is the "Sync Cue" when running in sync and happens at START when not running in sync.
5) Cue n is the "End of Show" cue.
6) Mute occurs only when there is a lens change, except at show start.

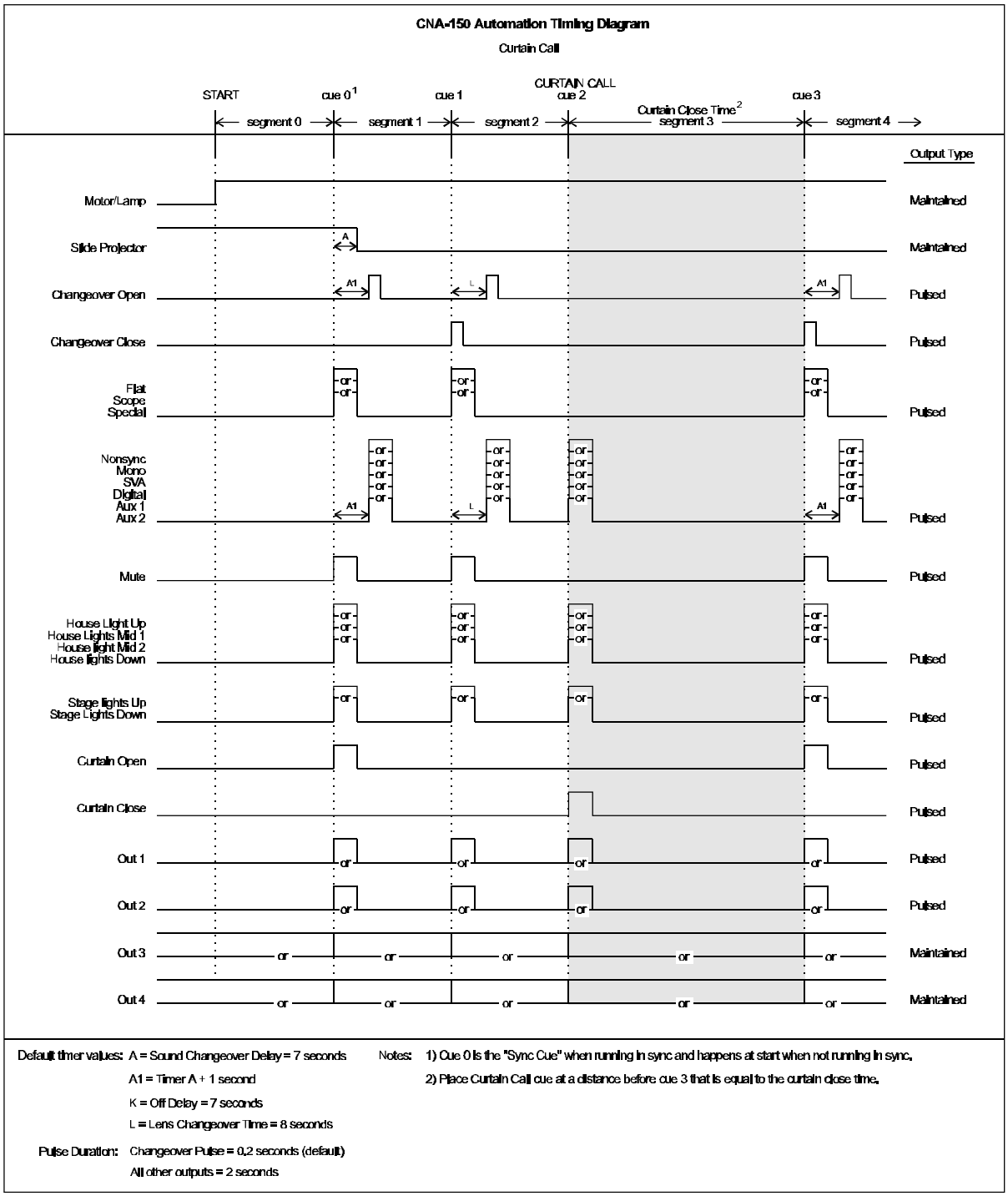


Default timer values: A = Sound Changeover Delay = 7 seconds
A1 = Timer A + 1 second
K = Off Delay = 7 seconds
L = Lens Changeover Time = 8 seconds

Pulse Duration: Changeover Pulse = 0.2 seconds (default)
All other outputs = 2 seconds

Notes: 1) Outputs are returned to the state that existed previous to fault or stop.
2) Alarm is set at fault.
3) Cue 0 is the "Sync Cue" when running in sync and happens at start when not running in sync.

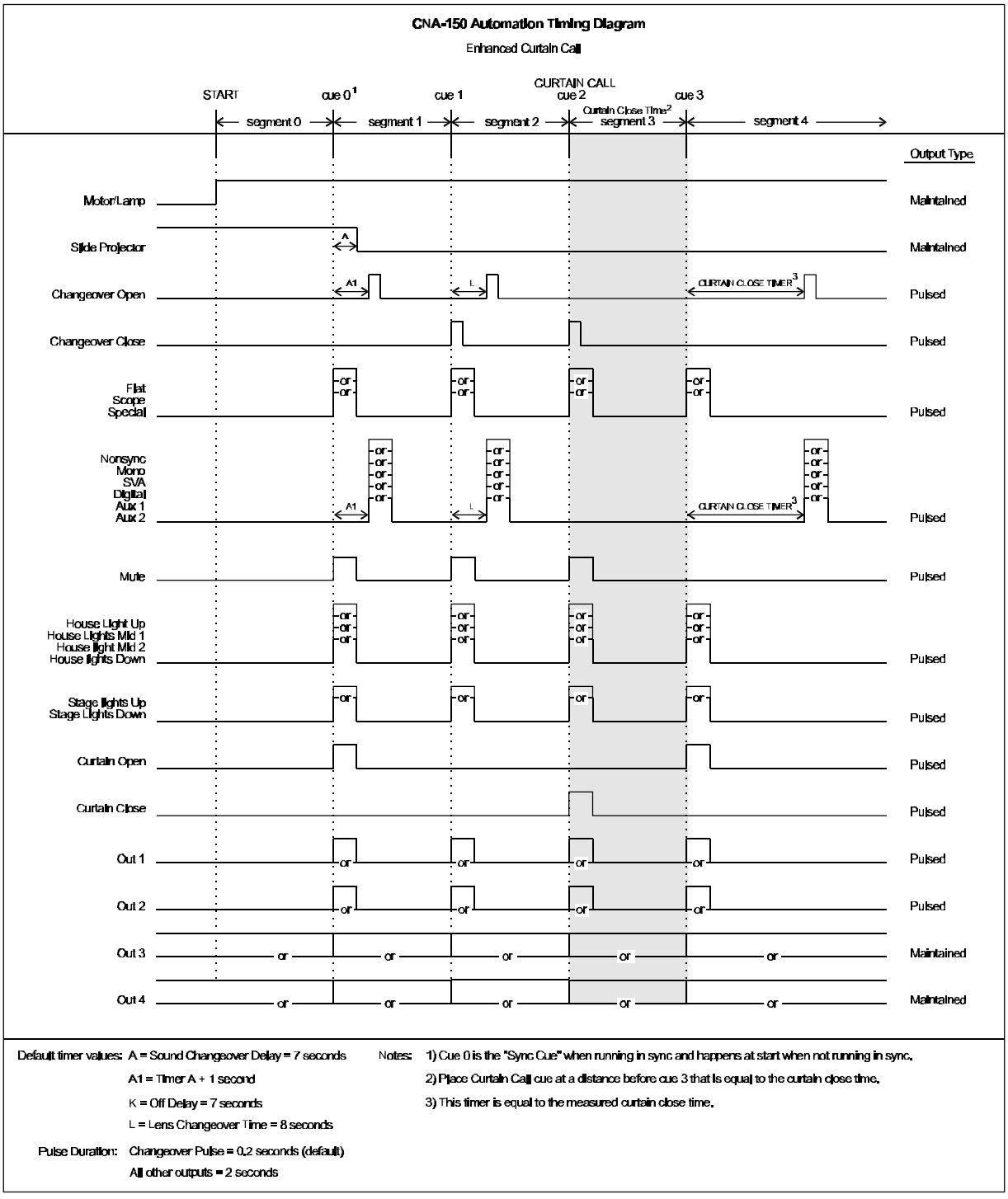

CNA-150 Automation Timing Diagram
Intermission Stop Sequence
START
cue 0 1
cue 1
INTERMISSION
cue 2
RESTART
cue 3
segment 0
segment 1
segment 2
segment 3
segment 4
Output Type
Motor/Lamp
Maintained
Slide Projector
Maintained
Changeover Open
Pulsed
Changeover Close
Pulsed
Flat
Scope
Special
Pulsed
Nonsync
Mono
SVA
Digital
Aux 1
Aux 2
Pulsed
Mute
Pulsed
House Light Up
House Lights Mid 1
House light Mid 2
House lights Down
Pulsed
Stage lights Up
Stage Lights Down
Pulsed
Curtain Open
Pulsed
Curtain Close
Pulsed
Out 1
Pulsed
Out 2
Pulsed
Out 3
Maintained
Out 4
Maintained
Default timer values: A = Sound Changeover Delay = 7 seconds
A1 = Timer A + 1 second
K = Off Delay = 7 seconds
L = Lens Changeover Time = 8 seconds
Pulse Duration: Changeover Pulse = 0.2 seconds (default)
All other outputs = 2 seconds
Notes: 1) Cue 0 is the "Sync Cue" when running in sync and happens at start when not running in sync.



Default timer values: A = Sound Changeover Delay = 7 seconds
A1 = Timer A + 1 second
K = Off Delay = 7 seconds
L = Lens Changeover Time = 8 seconds

Pulse Duration: Changeover Pulse = 0.2 seconds (default)
All other outputs = 2 seconds

Notes: 1) Cue 0 is the "Sync Cue" when running in sync and happens at start when not running in sync.
2) Place Curtain Call cue at a distance before cue 3 that is equal to the curtain close time.


CNA-150 Automation Timing Diagram
Enhanced Curtain Call
START
cue 0[1]
cue 1
CURTAIN CALL
cue 2
cue 3
Curtain Close Time[2]
segment 0
segment 1
segment 2
segment 3
segment 4
Output Type
Motor/Lamp
Maintained
Slide Projector
A
Maintained
Changeover Open
A1
L
CURTAIN CLOSE TIMER[3]
Pulsed
Changeover Close
Pulsed
Flat
Scope
Special
Pulsed
Nonsync
Mono
SVA
Digital
Aux 1
Aux 2
Pulsed
Mute
Pulsed
House Light Up
House Lights Mid 1
House light Mid 2
House lights Down
Pulsed
Stage lights Up
Stage Lights Down
Pulsed
Curtain Open
Pulsed
Curtain Close
Pulsed
Out 1
Pulsed
Out 2
Pulsed
Out 3
Maintained
Out 4
Maintained
Default timer values: A = Sound Changeover Delay = 7 seconds
A1 = Timer A + 1 second
K = Off Delay = 7 seconds
L = Lens Changeover Time = 8 seconds
Pulse Duration: Changeover Pulse = 0.2 seconds (default)
All other outputs = 2 seconds
Notes: 1) Cue 0 is the "Sync Cue" when running in sync and happens at start when not running in sync.
2) Place Curtain Call cue at a distance before cue 3 that is equal to the curtain close time.
3) This timer is equal to the measured curtain close time.