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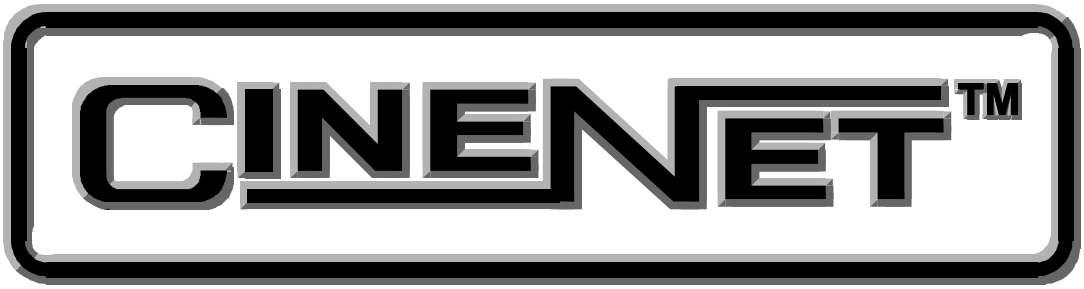


CNA-100 Cinema Network Automation

Reference Manual

September 17, 1998

WARRANTY INFORMATION

The CNA-100 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.

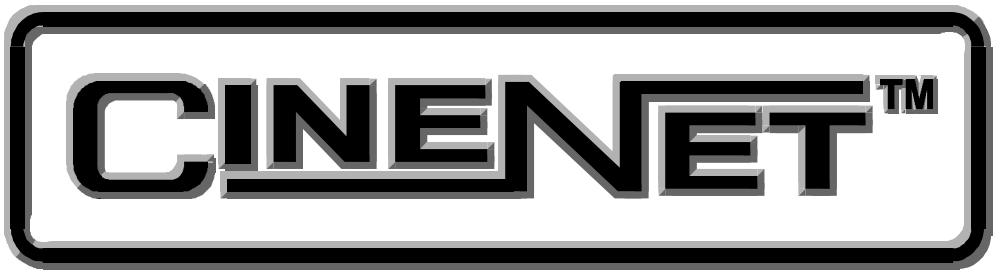
During the warranty period, STRONG INTERNATIONAL will repair or, at its option, replace components that prove to be defective, provided the unit is shipped prepaid to the manufacturer directly or via and authorized distributor. Not covered by this warranty are defects caused by modification, misuse or 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-100® 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-100 operator interface is user friendly and self-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-100 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-100 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-100 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-100 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-100 Cinema Network Automation System is a microprocessor based computer automation designed to automate all aspects of the theatre presentation. The major features of the CNA-100 are listed below.

Local I/O Network (LIN)

Each system component is connected to the network and communicates via a five wire cable. This cable provides the serial communications as well as 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. Console Termination Panel
2. Booth Termination Panel
3. CNA-100 Control Panel

The CNA-100 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 two-wire data link that will support 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 LIN are described in the following sections.

Control Panel (Operator Interface)

The automation controller and front panel interface is a self-contained unit that can either be surface mounted to the booth wall or can be mounted in a standard 19" rack. 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-100 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-100 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 up to 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 - Momentary FLAT/SCOPE
5. LENS - Momentary SPECIAL
6. CURTAIN - Momentary OPEN/CLOSE
7. HOUSE LIGHTS - Momentary UP/DOWN
8. STAGE LIGHTS - Momentary UP/DOWN
9. AUXILIARY - Momentary ON1/ON2

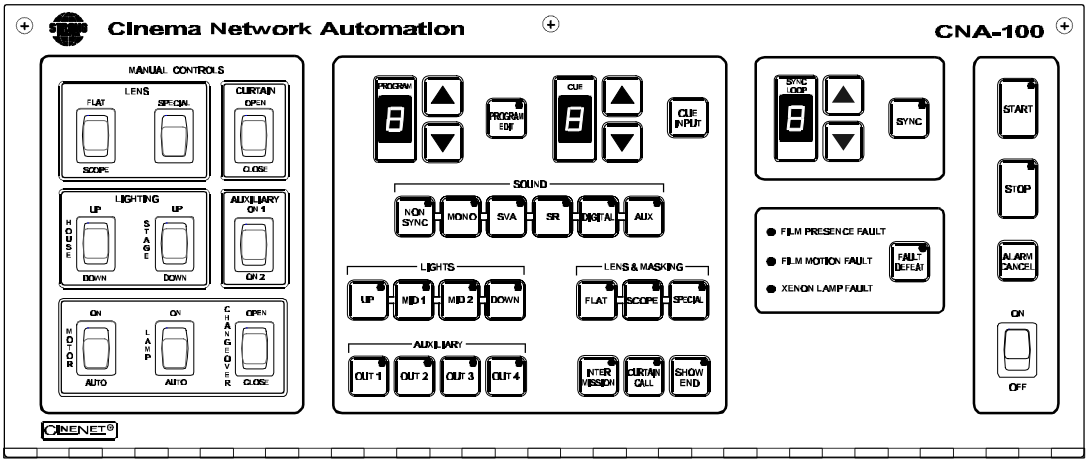


Figure 1.1

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.

Fault Status LEDs

These LEDs display the status of the fault conditions: *Film Presence*, *Film Motion* and *Xenon Fault*. The LEDs are "off" when there is no fault present. When a fault exists, the LED will "blink" rapidly.

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.

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
- Auxiliary Output; 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

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.

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-100 should be installed only by an electrician, engineer or other qualified personnel. No special equipment or tools are required for installation. Typically the CNA-100 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.

Wiring the CNA-100 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-100 systems only) to all CNA-100 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, open the front panel by removing the three screws along the top-front of the unit. 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 selectors switch.

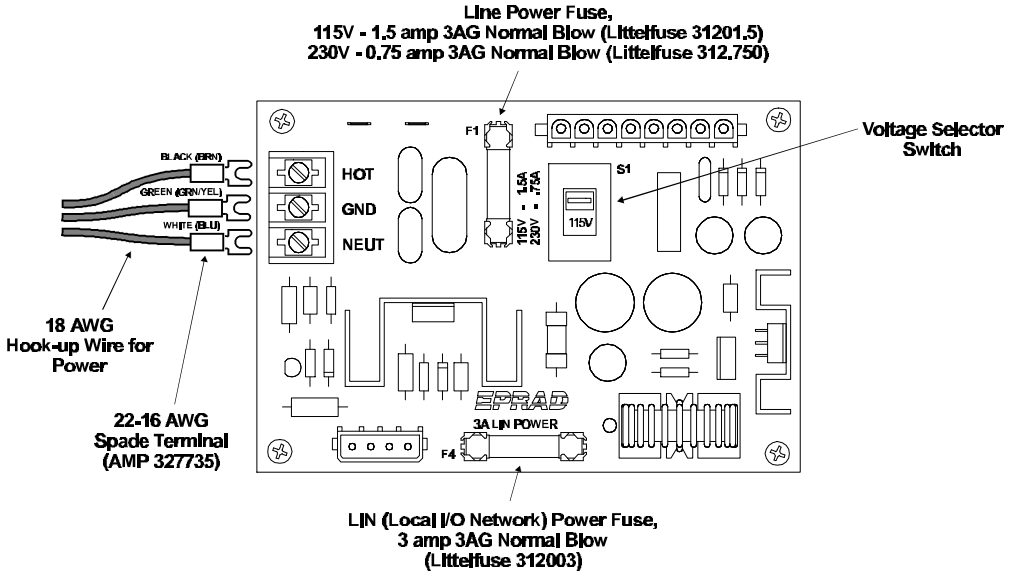


Figure 2.1

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. All units are shipped from the factory with a 1.5 amp line fuse (F1). If 230 volt ac operation is required, it is the responsibility of the installer to change this to a 0.75 amp fuse. (Littelfuse #312.750). Remember, before servicing these fuses, be sure power is removed from the unit.

Wiring between the CNA-100 automations and system peripherals are shown in figure 2.2. The wiring between the components and systems are accomplished with two communication networks. These are the LIN and LSN.

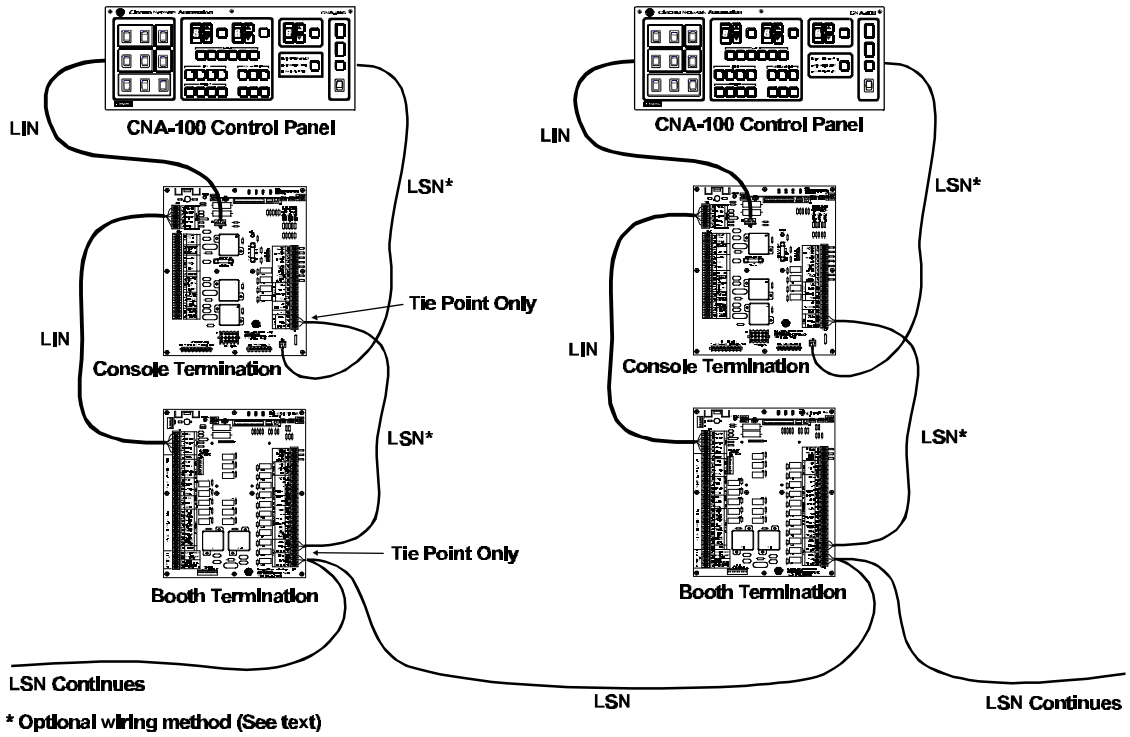


Figure 2.2

The CNA-100 Main Controller controls the Console and Booth termination boards via the LIN (Local I/O Network). This is a five wire 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-100 systems is accomplished via the LSN (Local Sync Network). The LSN provides a communications path between the CNA-100s, Remote Monitors and a PC host. The network supports synchronous communications for interlock, copy functions and remote status and control.

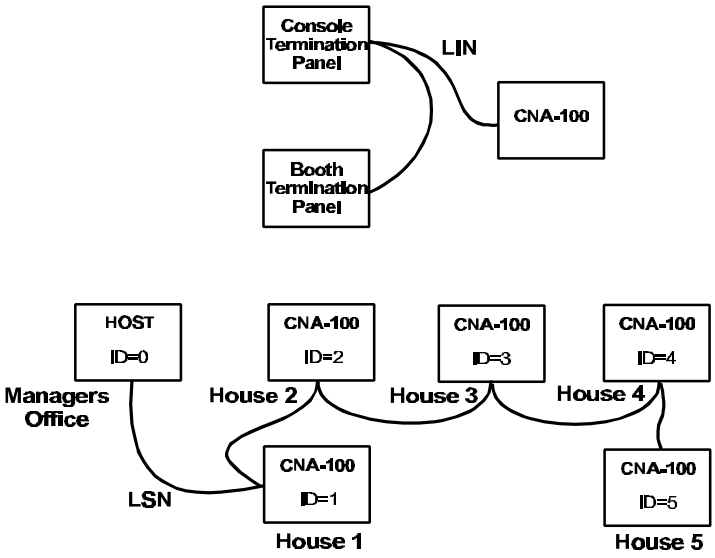
Figure 4 shows the LSN cable wired between the main controller and termination boards. The connections on the termination boards are tie points only, that provide a path to the main controller. It will typically be more convenient for the installer to connect CNA-100 systems together at the Booth termination board.

The cable is 2 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.

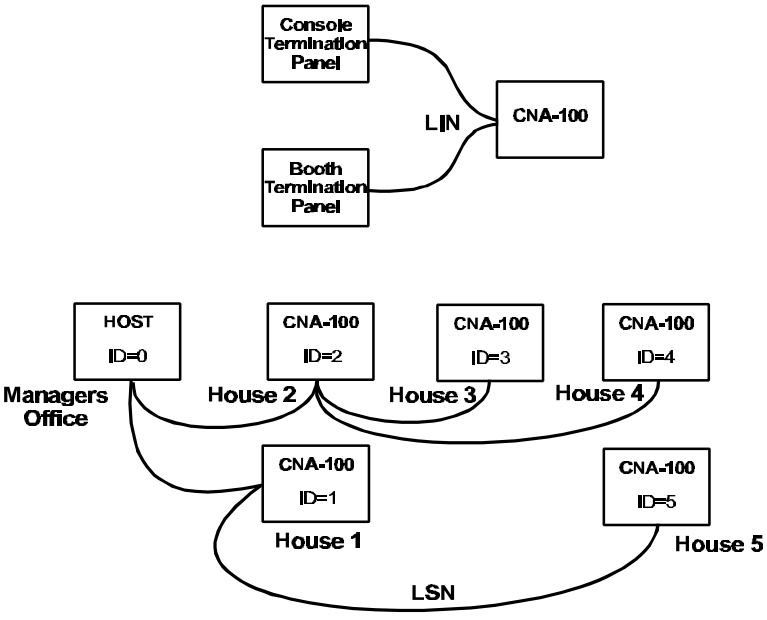
LSN cable specifications: Twisted pair, 24 AWG with overall shield and drain wire (Alpha #6412, Belden #9841 or equivalent).

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 optimal 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.

Figure 2.3

Normally the installer will wire the LSN and LIN at the 39331 Booth or 39330 Console termination board. It may also be necessary to wire directly to the 39325 Main Board (if is has not already been wired at the factory). Figure 2.4 shows how the LSN and LIN are terminated to the Main Board.

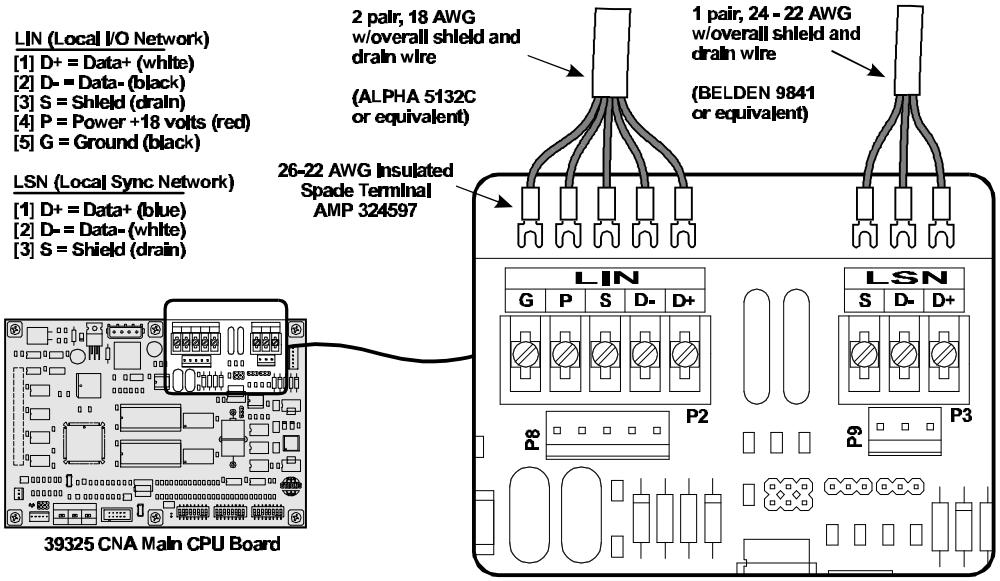


Figure 2.4

Configuring the System

The LSN can support up to 64 devices (CNA-100s, 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-100s and other devices as necessary. To keep things simple, assign the CNA-100 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 SW1. See figure 2-5.

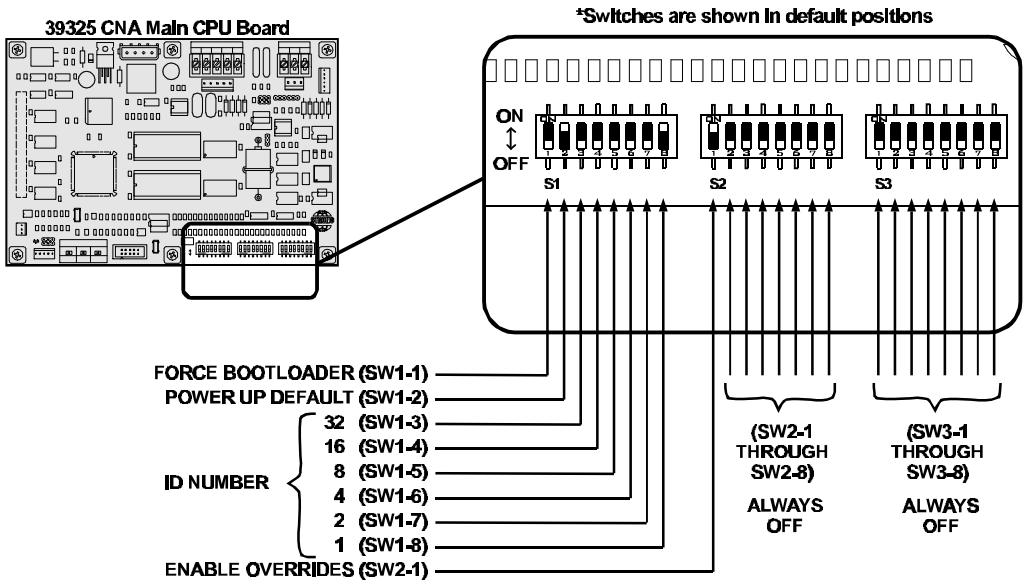


Figure 2.5

SW1-1 FORCE BOOTLOADER - This is for future use. This switch must be in the OFF position for normal use.

SW1-2 POWER UP DEFAULT - When in the ON position, the Supervisory Defaults are loaded into memory at power up. Move this switch to the OFF position if the Supervisory default values are changed from the CineNet Host program.

SW1-3 through SW1-8 ID NUMBER - The Id is represented by a 6 bit binary number, which allows for 64 combinations (0 - 63). Each digit in a binary number has a decimal value (shown to the left of each switch position). To easily convert

a binary number to a decimal number, just add up the decimal values of all the digits that are "on". For example, if SW1-5 and SW1-7 are on. The decimal equivalent is 10. See table 2-6 to configure the CNA-100s Id number with switches S1-3 through S1-8.

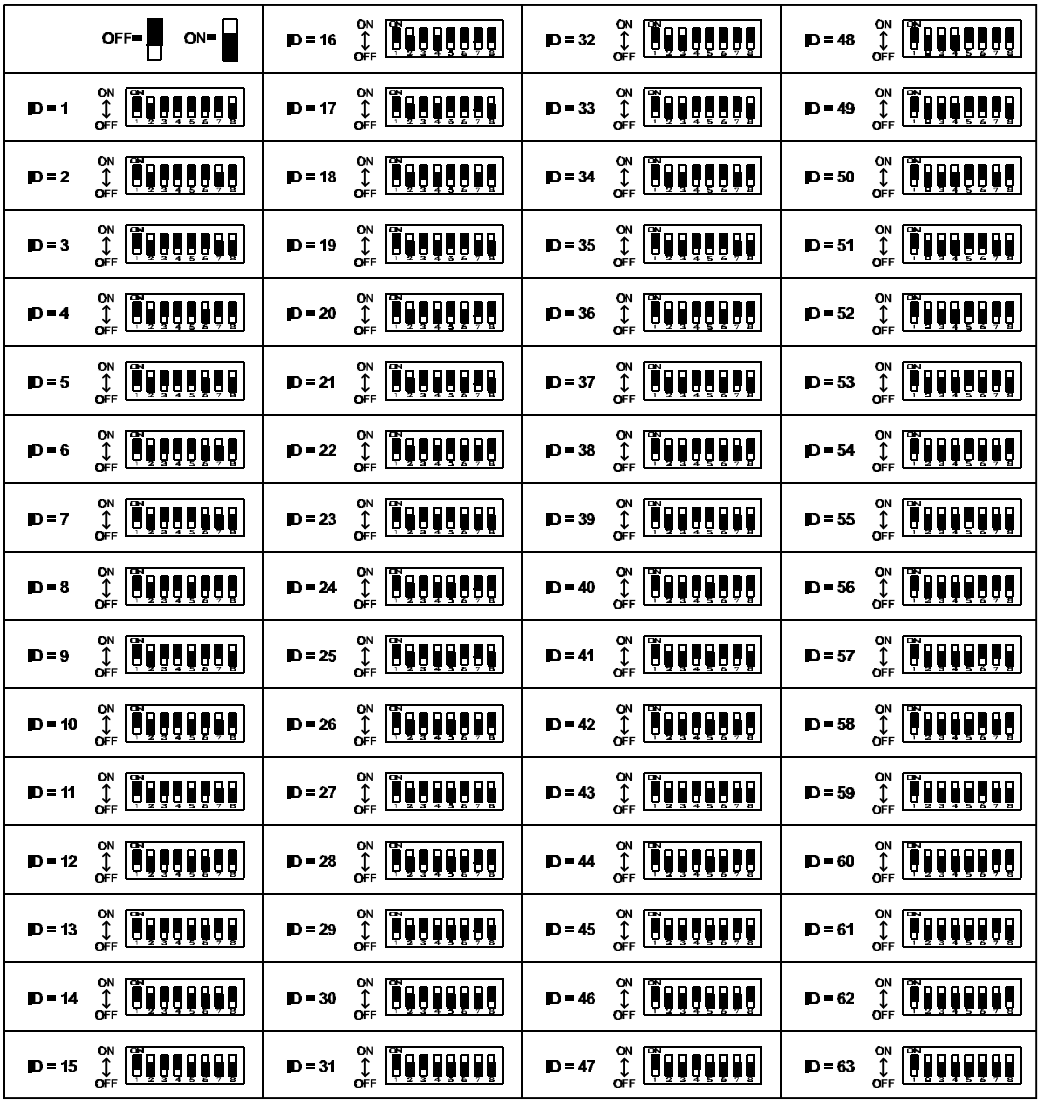


Figure 2.6

SW2-1 ENABLE OVERRIDES - This switch should be in the ON position to enable the *soft* overrides. During operation pressing the Sound, Lights, Lens & Masking or Auxiliary switches on the front panel will change the state of outputs, but will not change the saved program.

The remaining switches are undefined and should be in the OFF position.

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.

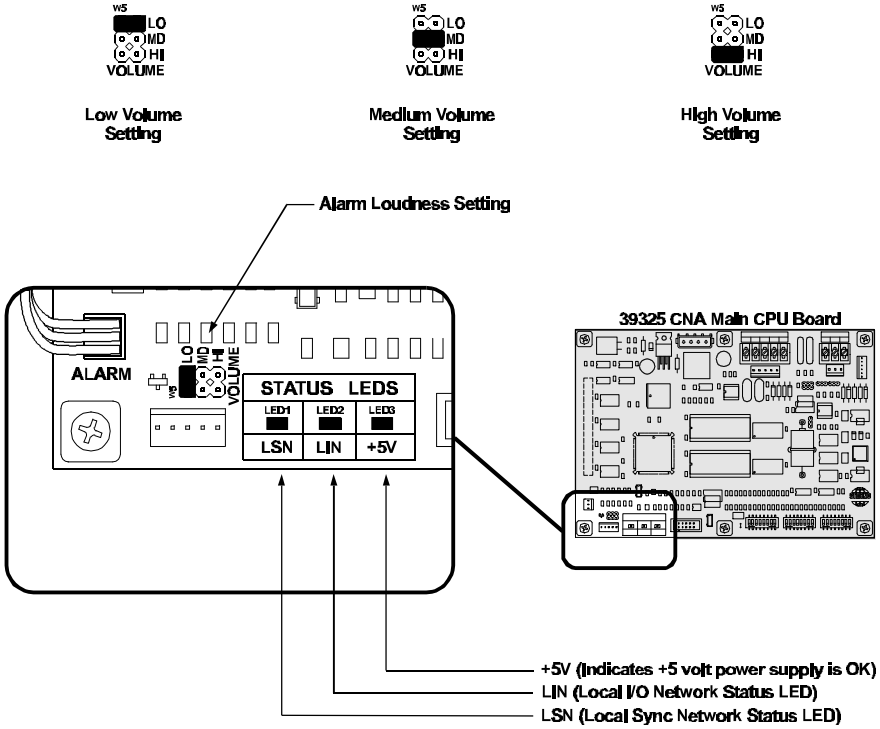


Figure 2.7

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-100 computer is working and is communicating properly.

Slow Blinking Rate: The CNA-100 computer is working, but is *not* communicating.

Off: The CNA-100 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.

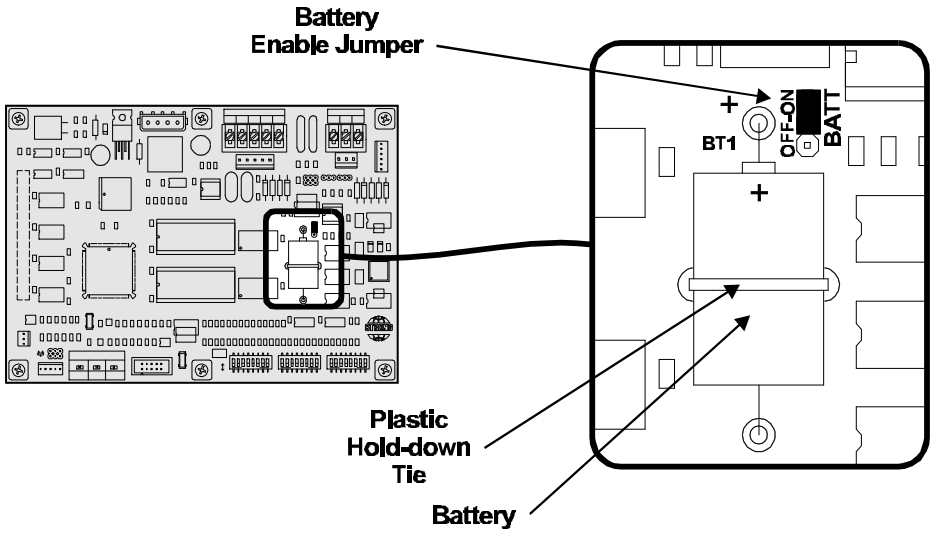
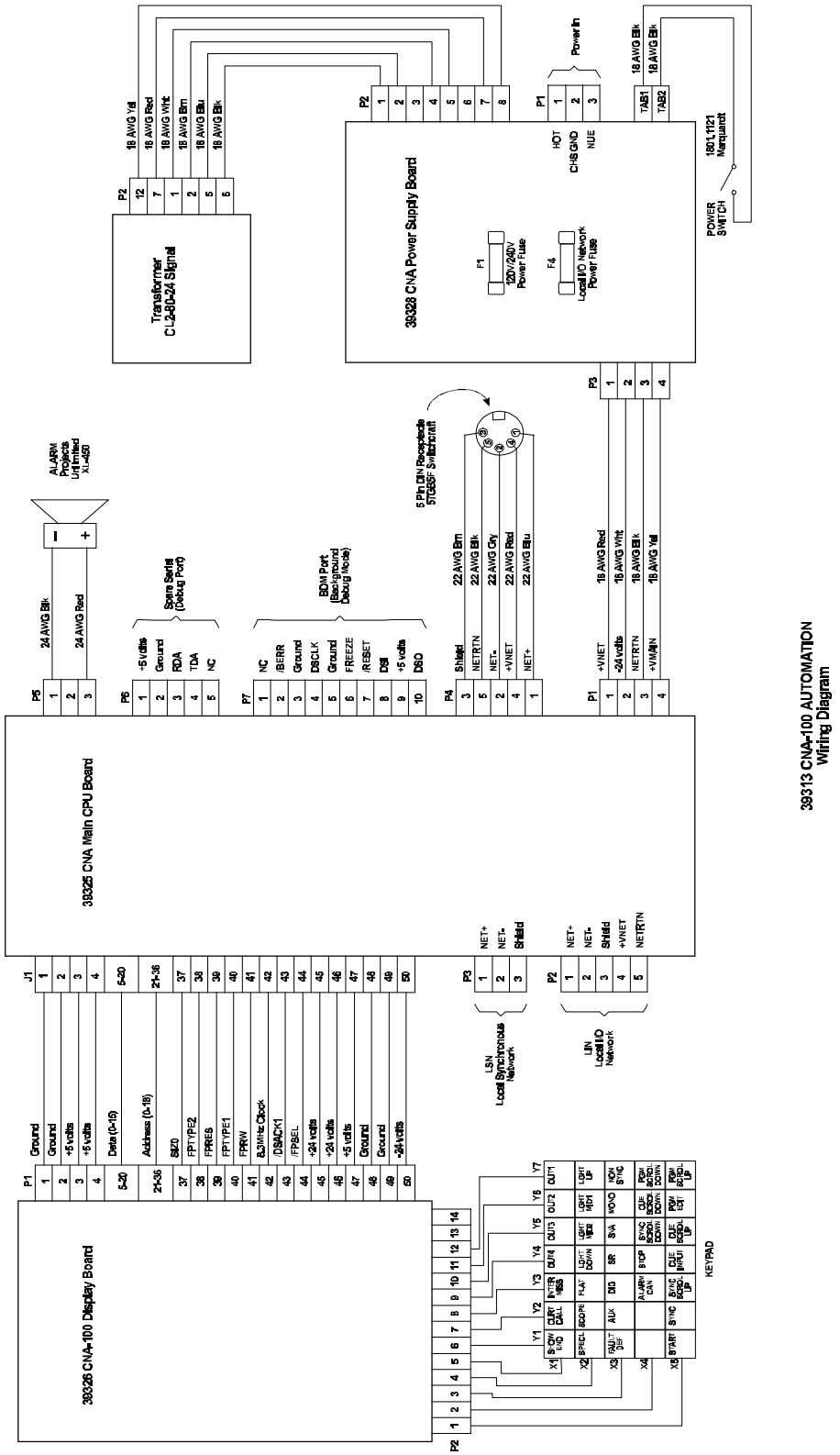


Figure 2.8


39313 CNA-100 AUTOMATION
Wiring Diagram
39328 CNA Power Supply Board
Transformer
CL240-24 Signal
39325 CNA Main CPU Board
39326 CNA-100 Display Board
KEYPAD
AL-ARM
Projects
Unlimited
AL-450
5-Pin DIN Receptacle
57GB5F Switchcraft
POWER
SWITCH
1801.1121
Marquardt
Power In
HOT
CHASGND
NUE
F1
220V/240V
Power Fuse
F4
Local I/O Network
Power Fuse
Spare Serial
(Debug Port)
BDM Port
(Background
Debug Mode)
LSN
Local Synchronous
Network
LIN
Local I/O
Network
18 AVG Yel
18 AVG Red
18 AVG Wht
18 AVG Brn
18 AVG Blu
18 AVG Blk
22 AVG Brn
22 AVG Blk
22 AVG Gry
22 AVG Red
22 AVG Blu
24 AVG Blk
24 AVG Red

Termination Boards

All of the booth and auditorium peripheral 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.

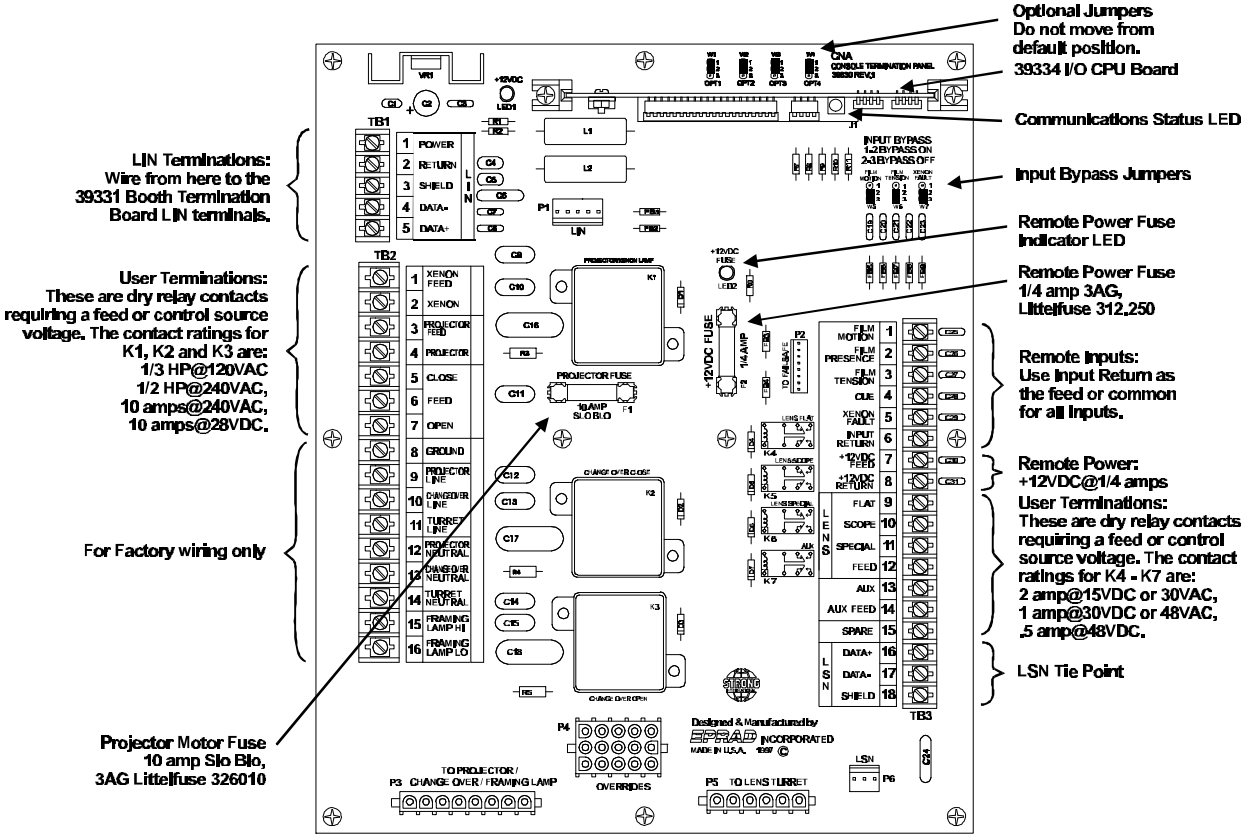


Figure 2.10

The 39334 I/O CPU Board plugs into the J1 connector on both termination boards. The purpose of this board is to handle the communications to and from the CNA-100 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-100 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.

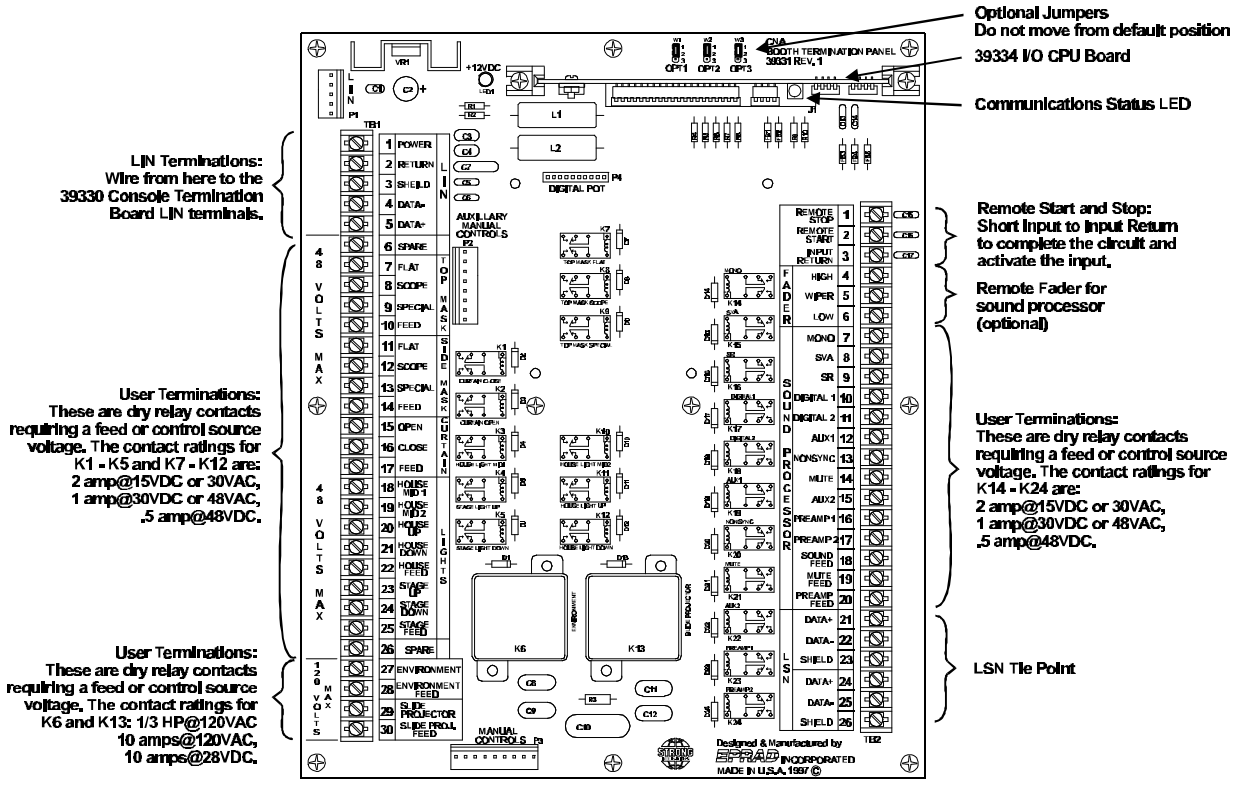


Figure 2.11

Installation Guidelines

The CNA-100 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-100 is listed below.

Microcomputers by their very nature, are susceptible to noise and power supply fluctuations. While the CNA-100 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-100 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.

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.

Programming the CNA-100

Programming is accomplished with the *Programming* keys and the *Program* and *Cue* numbers. The CNA-100 gives the user the ability to build and store up to 9 different programs. Each Program can use up to nine cues.

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 using the programming keys. Program the Auxiliary outputs (OUT 1 through OUT 4) if an 'Aux Board' is connected to the system. One or more of these outputs can be on at a time.

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 (including the program that is running).

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 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

Operating the CNA-100

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-100 is waiting to see.

Soft Manual Overrides

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.

Synchronous Operation

The CNA-100 systems are capable of running film synchronously in a multi-projector booth. The CNA-100 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 may be 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 or not.

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-100 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, *run-time* faults and *failsafe* 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-100 is powered up. Each of the Programs (1 through 9) and the System Parameters have a checksum. The fault messages are displayed and "blinked" rapidly on the three digital 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
P A r	System Parameters 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 it. 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.

A *System Parameters* memory fault will be displayed if there is a checksum error. This error must be cleared from the *Host PC*, by copying the system parameters from the Host Program to the CNA-100. If you are not using a Host PC, the system will be using the *default* parameters and can not issue a System Parameters Checksum Fault.

Run-Time Faults

These three messages will be displayed if there are the following communications faults.

Message	Description
L I n	Local I/O Network Fault
L S I	Local Sync Interlock Fault
L S C	Local Sync Communications Timeout Fault

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-100 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.

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-100s on the sync loop will display "L S I" 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.

A Local Sync Communications 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.

Sync Interlock Failsafe Fault

This fault indicates the master or one of the slave CNA-100s has a failsafe fault that is preventing the interlock loop from *resuming* a show. The following message is displayed to indicate this fault.

Message	Description
L S r	Not Ready To Resume Fault
L S r	Need Master To Resume Fault
L S r	Not Ready To Run

The Not Ready To Resume Fault indicates that the automation cannot start a show because a least one of the CNA-100 remotes are not in the "Ready to Resume" condition.

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.

The Not Ready To Run Fault indicates that the automation cannot start a show because a least one of the CNA-100 remotes are not in the "Ready to Run" condition

Power Up Messages

Upon power up, the CNA-100 will display a series of messages. The following messages should be displayed at power up:

Message	Description
1 0 5	Version Number (2 seconds)
2 1 0	Checksum Number (2 seconds)
P U P	Power Up Reset (2 seconds)

These messages will be displayed in this order each time the CNA-100 is powered up. Each message is displayed for about 2 seconds. The first message is the software version number (version 1.05). The second is the software checksum number, and the last message indicates to the user that it is a power up condition.

Timing Diagrams for the CNA-100

The following Timing Diagrams show timer values, output configurations and cue events for all the outputs. **Timers and output configurations such as pulsed/maintained, power up and fault conditions are defaulted on the CNA-100, and can only be changed with the Host Program.** These timing diagrams can be extremely useful to help understand the operation and capabilities of the CNA-100. 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.

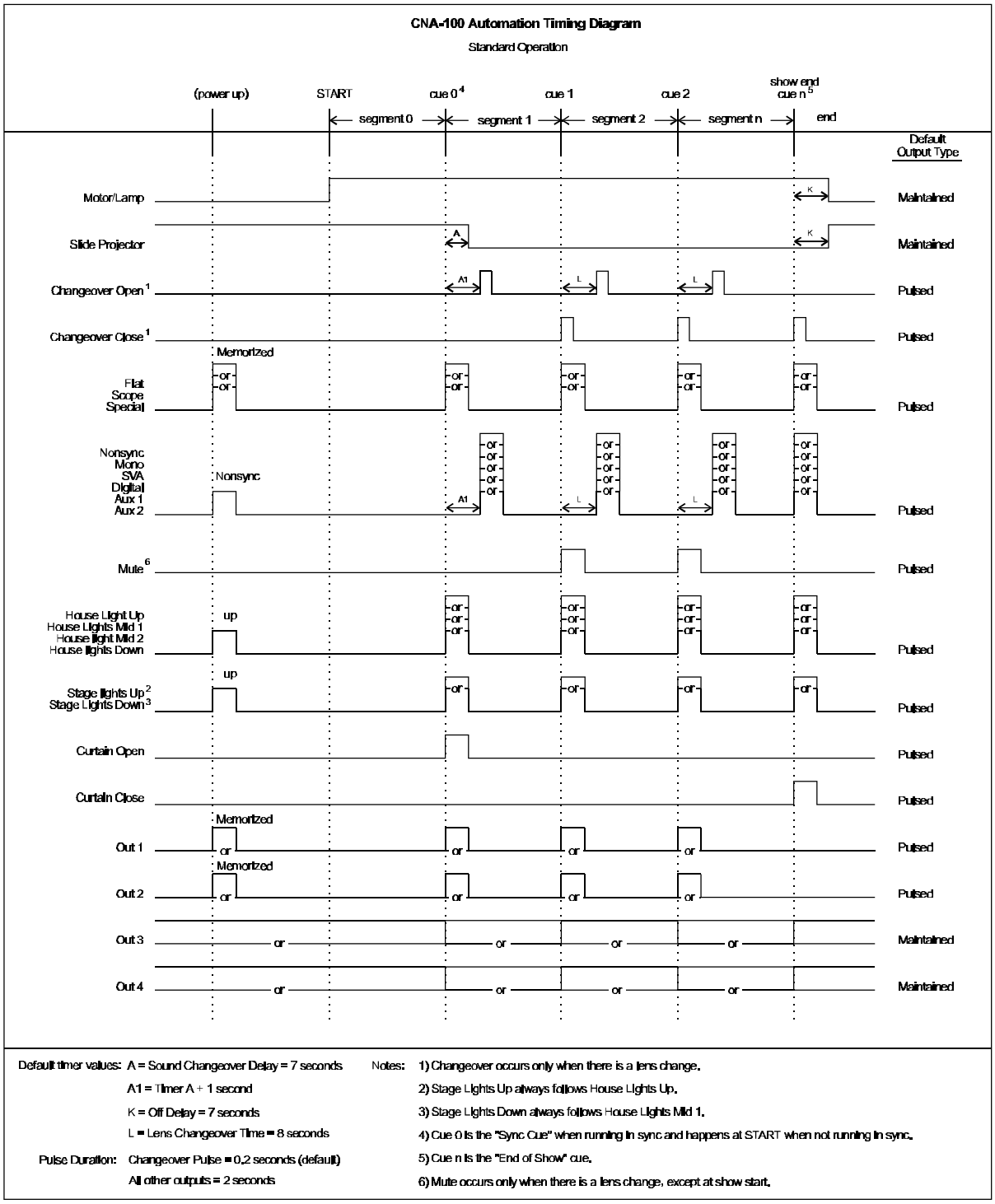
The second timing diagram shows the Fault/Stop Shutdown and Restart Sequence. The area of interest is the shaded portion of the diagram. This shows the default 'Fault-to' conditions:

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-100 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.

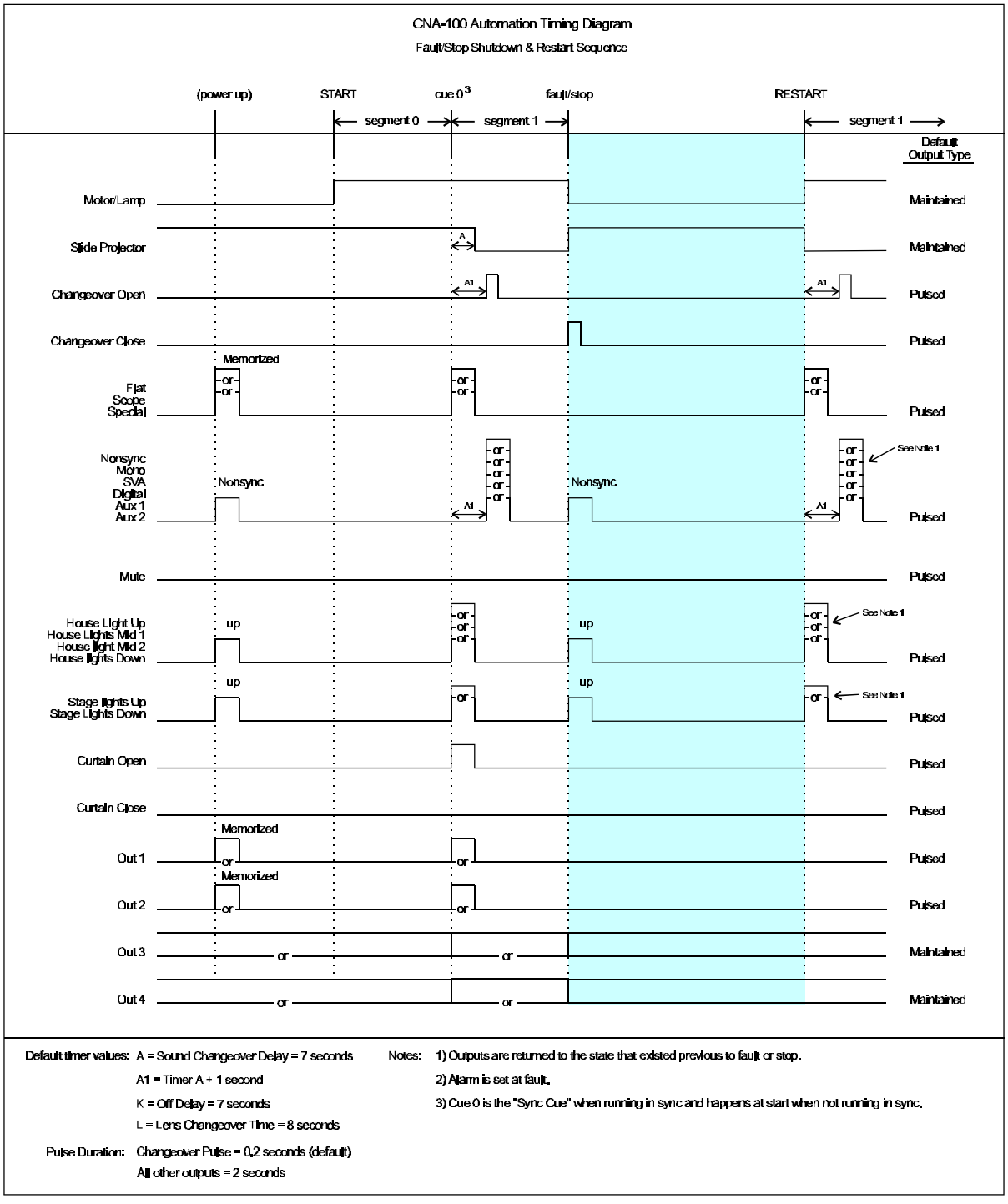
The last timing diagram shows the Curtain Call Sequence. The area of interest is the shaded portion of the diagram. At the Curtain Call cue, the curtain begins to close. The 'next' cue will begin to open the curtain. The 'curtain close time' is determined by the distance between the curtain call cue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

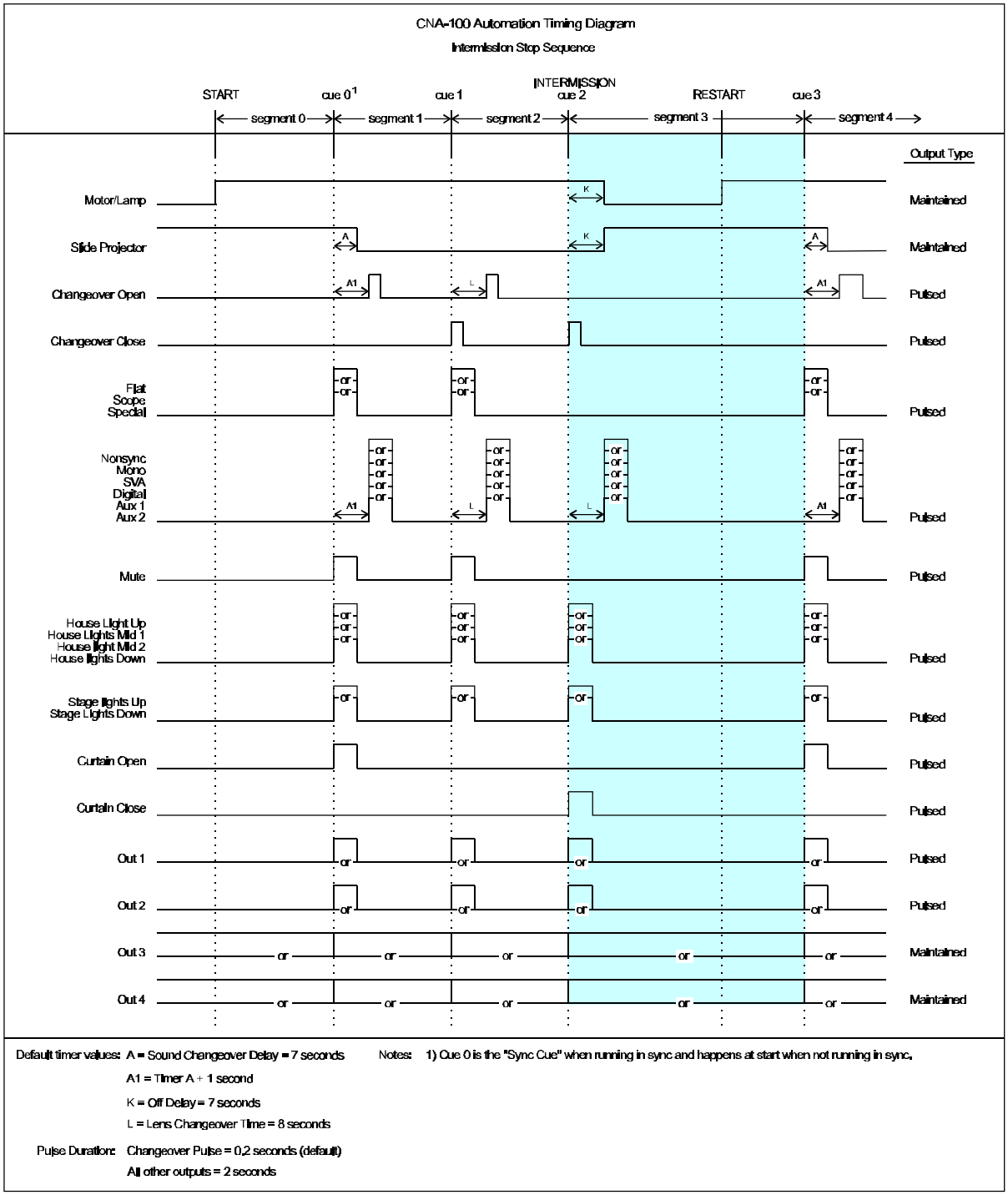


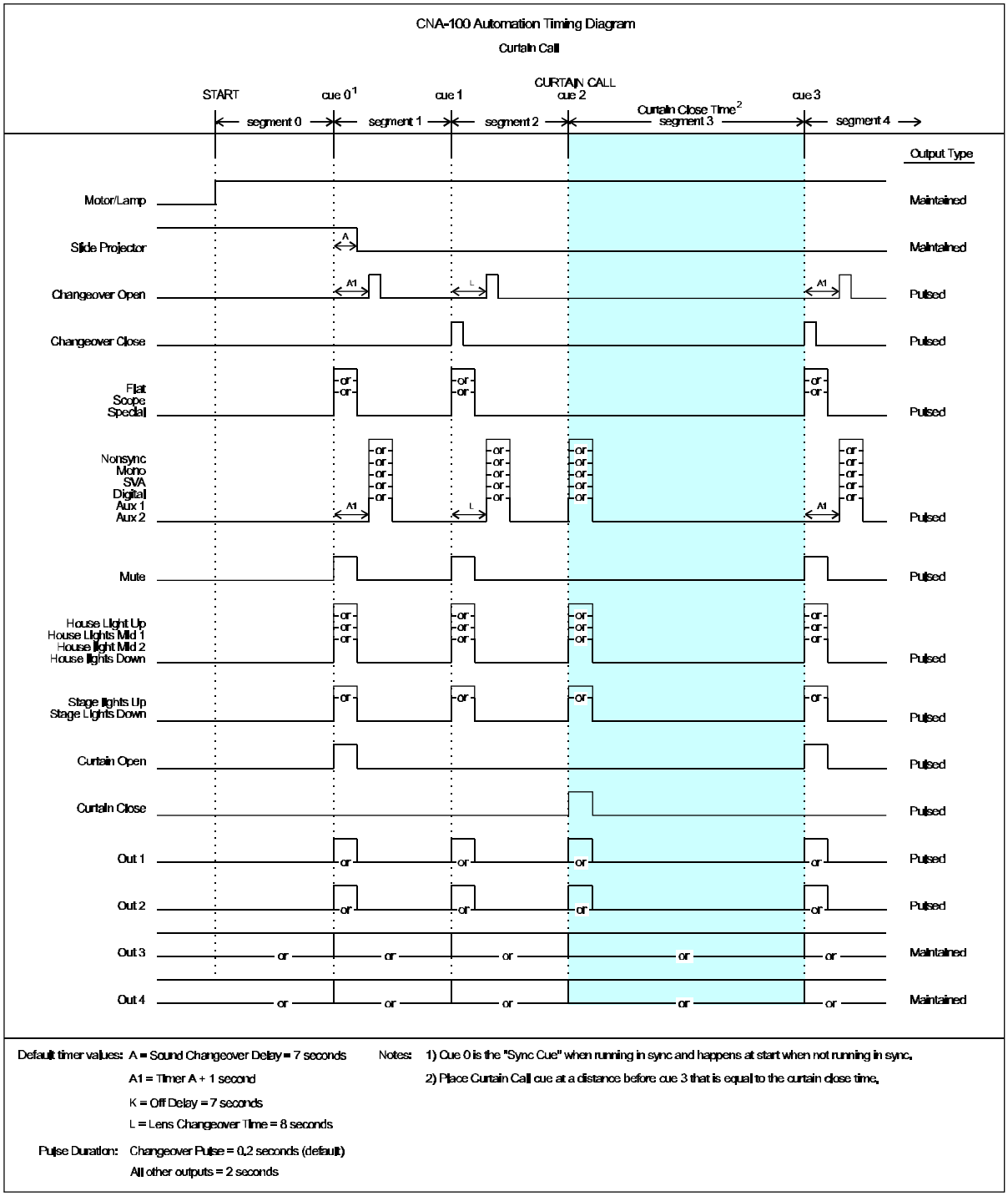
Default timer values: A = Sound Changeover Delay = 7 seconds
A1 = Timer A + 1 second
K = Off Delay = 7 seconds
L = Lens Changeover Time = 8 seconds

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.


CNA-100 Automation Timing Diagram
Fault/Stop Shutdown & Restart Sequence
(power up)
START
cue 0 3
fault/stop
RESTART
segment 0
segment 1
segment 1
Default Output Type
Motor/Lamp
Maintained
Slide Projector
A
Maintained
Changeover Open
A1
A1
Pulsed
Changeover Close
Pulsed
Memorized
or
Flat
Scope
Special
Pulsed
Nonsync
Mono
SVA
Digital
Aux 1
Aux 2
Nonsync
Nonsync
A1
A1
See Note 1
Pulsed
Mute
Pulsed
House Light Up
House Lights Mid 1
House light Mid 2
House lights Down
up
up
See Note 1
Pulsed
Stage lights Up
Stage Lights Down
up
up
See Note 1
Pulsed
Curtain Open
Pulsed
Curtain Close
Pulsed
Memorized
Out 1
Pulsed
Memorized
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) 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-100 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.


CNA-100 Automation Timing Diagram
Curtain Call
START
cue 0 1
cue 1
CURTAIN CALL
cue 2
Curtain Close Time 2
cue 3
segment 0
segment 1
segment 2
segment 3
segment 4
Output Type
Motor/Lamp
Maintained
Slide Projector
A
Maintained
Changeover Open
A1
L
Pulsed
Changeover Close
Pulsed
Flat
Scope
Special
or
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.