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OPERATING INSTRUCTIONS
MODEL VA101-01 AUTOMATION SYSTEM
AND SY101-01, ST101, SR101

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DRAWINGS

	<u>NUMBER</u>
VA-101-01WM - Outline Dimensions	1146376
Schematic VA-101-01	1145990
Timer Board Schematic	1146053
VA-101-01 Power Supply Board Schematic	1136478
ST-101-01 Remote Status Box Schematic	1136125
SR-101-01 Remote Status Box Schematic	1146227
Sync Control Box SY-101-01 Schematic and Sync Interconnecting Wiring	1146114
SY-101-02 Schematic and IC Wiring	1146640
VR-101-01 Remote Box Schematic	1136537
VR-101-02 Remote Box Schematic	1146698
Conduit and Wiring Layout Projection Booth #1	1156120
Projector/LH Interconnecting Wiring Schematic Timer Module	1146624
1126409	
Sync Connector Wiring	1126504

1.1 SCOPE

This technical manual provides installation and operating instructions for the ORC Automation System Type VA-101-01. This system is designed to be installed in either the ORCON II Theatre Console as an integrated package, or operate as a conventional wall mount unit when necessary. When requesting information about the unit, always furnish both serial and model numbers.

1.2 GENERAL DESCRIPTION

The ORC VA-101-01 automation system provides many unique features for the multiple theatre operator. Special attention has been given to the problem of operating two interlocked projection systems from the same print as well as providing maximum flexibility for individual single projector operation.

Operating theatres in either the single or interlock modes calls for different handling of start-ups, intermissions, shutdowns, and alarm conditions which many projectionists may not be familiar with. The initial selection of single or interlocked operation theatres is done from a control box (SY-101) conveniently located on the front wall.

This action engages all of the interlock and control circuits to assure and monitor a trouble-free presentation from start up to shutdown in either mode, with or without intermission.

The functions which are selected from this control box are mode selection (Normal/Sync), Selsyn Power On/Off, and Overriding emergency lock in the event the automated selection malfunctions.

An integral design feature of the VA-101-01 is its capability for providing a system status and alarm signal to the ST-101 status and SR-101 remote status boxes.

The ST-101 box provides a visual display to indicate the status of intermission, normal, or film break conditions in all theatres. The intermission displays are amber, and the emergency displays are red. Also, an adjustable "Sonalert" audio alarm which is energized in the event of film break is contained in the ST-101.

The SR-101 functions the same as the ST-101, but with a unique feature which allows the concession operator or theatre manager to cancel the remote alarm without inhibiting a response to a second film break in a different theatre. The alarm circuit is automatically rearmed when the problem projector is restarted.

Once the mode of operation is selected at the sync control box, the projectionist starts his presentation from the automation panel of either console for "Sync" operation, or at the individual consoles for "Normal" operation.

If "Normal" operation is selected, pushing the "Start" switch begins the show by starting the projector motor and xenon light and after an adjustable delay, opening the douser (normally seven seconds). The house lights can be programmed to dim before or after the douser opens to create a variety of effects for different features. These time settings can be easily accomplished by potentiometer adjustment on a circuit card in the automation system.

An intermission ("split-show") feature is also provided to schedule intermissions for double features, or lengthy shows. These intermissions are automatically initiated by film cues at the proper location. When cued for intermission, the automation system stops the projector motor, shuts down the xenon

light, raises the house lights, and starts the non-sync sound. The film is also cued at its end so that in this "Normal" mode, it can repeat this procedure.

If "Sync" operation is selected, "Lock-Off" lights are turned on and the Lock-On switch on both automations are activated. Since the projection speeds have to be equal in the sync mode, synchronizing selsyn motors are needed and they must be phase registered and energized properly. To accomplish this, the automation system has a unique interlock circuit which simplifies the registration and guarantees correct phasing or start up is prevented.

At this point, the start switch will not start either projector motor if the selsyns are not in phase. The projectionist must manually rotate either projector until the selsyns are in phase as indicated when the "Lock-Off" light extinguishes. Activation of the start switch at either console then starts the projector motors, Selsyn drives, xenon lights, house lights, etc. The first cue then opens the first douser at a pre-determined time (before or after house lights have dimmed); and when the same first cue arrives at the second projector, the sequence of events is repeated at that console. Intermissions are then cued in the same way as in the "normal" operational mode, with the second machine set to "Intermission."

If the projectionist inadvertently makes a control error in either mode, he can immediately restart the system since the timers can be overridden instantaneously.

While operating in the sync mode, a film break automatically shuts down both projectors, the house lights will automatically be raised, and the non-sync sound activated.

In addition to lighting an alarm, the automation system causes an audible alarm which can be reset from only the failing projector by pushing the stop/alarm cancel, or by properly restarting.

Once the picture is on the screen, the automation system automatically switches the cue circuitry so that the next cue starts the intermission sequence. The projectionist does not have to remember to do this switching. The automation system also conveniently controls an intermission or split-show from a cue placed in the middle of a fully set up reel (or platter). This cue signal turns the projector(s) off at the proper time. In the case of an intermission in the sync mode, it also keeps the systems synchronized in preparation for restart. Activating the start switch will initiate the normal start up cycle.

Individual timing circuits are provided for house lights (raise and lower) and douser (open and close), at the beginning and end of the feature. Simple screwdriver adjustments are provided for setting these times.

Should an emergency occur at any time, an immediate restart can be accomplished because the timers are instantaneously reset.

The automation system provides for complete manual operation for the douser, sound (exciter lamps), projector motors, and house lights.

SECTION 2 - INSTALLATION

2.1 RECEIVING/HANDLING

Remove all packing material and carefully inspect for possible shipping damage. Any claims for loss or damage that may have occurred in transit must be filed by the buyer with the carrier. Copy of bill of lading and freight bill will be furnished on request. When requesting information, be sure to furnish the serial and model numbers.

2.2 MECHANICAL INSTALLATION - MODEL VA101 CONSOLE MOUNT

The Model VA101 Automation System is designed for use in the Orcon II console. If ordered at the same time as the Orcon II, it will be installed at the factory and the following discussion can be disregarded; go to Section 2.5.

For field installation, perform the following steps:

- a. Disconnect power to the Orcon II at main breaker box.
- b. Remove the dummy panel on the operating side. Also, remove the upper and lower panels on the nonoperating side.
- c. Fasten the slide mounting rails with the existing mounting holes.
- d. Slide the automation chassis into the fixed rails.
- e. Check for proper fit around the edges of the panel. Vertical adjustment is made by the slotted holes in the side mounting rails. Horizontal adjustment is made by loosening the three screws holding the panel to the automation chassis.
- f. Install prewired terminal strips on marked locations in junction box TB-3 and TB-4). Make indicated connections to TB-2 and TB-5 (existing terminal strips) as per drawing 1145990.
- g. When the wiring is completed, the system can be secured in place with the two front panel screws.

2.3 MECHANICAL INSTALLATION - MODEL VA101-01WM WALL MOUNT

Mount the enclosure on a solid wall, close to the normal operating position with three 1/4" mounting bolts. Refer to Drawing #1146408 for conduit installation.

2.4 ELECTRICAL INSTALLATION - MODEL VA101-01

Electrical connections are made to the electrical junction box which is located behind the lower non-operating side panel. Internal wiring is done in the factory to minimize installation time. External connections to house and projector circuits are made to terminal boards TB-3 and TB-4 which are appropriately marked as to function. These connections are shown on the schematic (#1145990).

2.4.1 PICTURE CHANGEOVER DOUSER (TB-3 TERM. 1-2-3)

This circuit supplies 115V AC pulses, both manual and automatic, for operation of standard domestic type changeover coils. If a "cold contact" closure or "hold" type operation is required, it can be modified by referring to the Schematic #1145990, or it can be factory modified if requested.

2.4.2 MOTOR (TB-3 TERM. 4 AND 5)

115V AC, single phase 15 amp circuit is supplied by the automation equipment. The projector manual section of the front panel contains a heavy duty motor switch; consequently, the installation of the normal motor switch is not required. Foreign projectors with the three phase motors (start only-single phase run) may be readily operated by the addition of a single relay (typically MS-2AY). Consult the factory for specific information.

2.4.3 LAMP (TB-2 Term. 14 and 15)

These connections are factory installed in the console version. In wall mount units, the circuit constitutes a simple circuit closure which occurs simultaneously with the motor start, and holds for the duration of the "motor run" time. A separate manual lamp switch should be provided if none is on the equipment.

2.4.4 EXCITER - SOUND CONTROL (TB-4 Term. 1 and 2)

With the automation factory installed in the console version supplied with a sound system, the only requirements are to connect the exciter lamp to term. 1 and 2 on TB-3. In the wall mount unit, an external exciter lamp supply must also be connected. See diagram supplied with wall mount unit for terminal connections. The automation system sound control is also compatible with 4 track, 6 track, pulse, and audio "hold" sound systems. Because of the many variations, it would be advisable to contact the factory for such special applications.

2.4.5 NON SYNC (TB-5 Term. 3 and 4)

This is a contact closure which is sustained whenever the exciter lamp is off when operating in the automated mode. It may be used to control the motor of a tape deck, or when installed in the console in conjunction with the VS 250 Sound System and VF 100 Fade Module, will control smooth non sync music fade in and out.

2.4.6 HOUSE LIGHTS

Connections to the house lights dimmer control are made to TB-3, 6, 7, and 8. The selection of either pulsed or maintained contacts is discussed in Section 2.6.

2.5 ELECTRICAL CONNECTIONS - MODEL VA101-01WM

Connections to the wall mount version are the same as described above except for the terminal designators. Refer to drawing 1146412.

2.6 HOUSE LIGHT CONTROL

The VA101-01 Automation System is designed to provide maximum flexibility in matching various house light dimming controls by means of an octal jumper plug (J-3) located on the automation chassis.

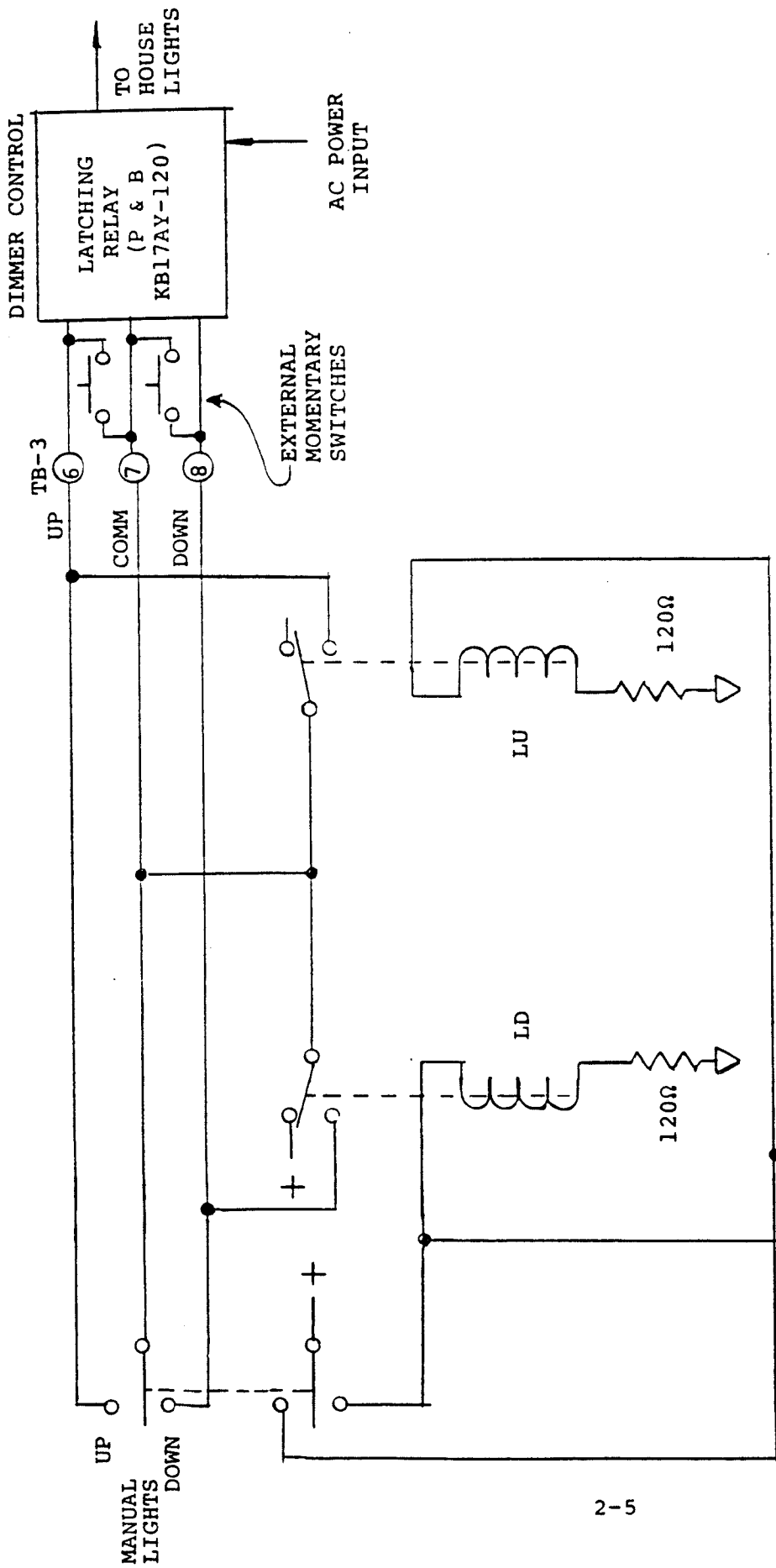
By changing this jumper plug, it is possible to provide:

1. Short ($\frac{1}{2}$ second) relay contact closures for lights up (LU) and lights down (LD)
2. Long pulse (1-15 seconds) closures to drive motor dimmers when it is necessary to have remote control switches in parallel with the control lines, and
3. Latched closures to drive motor dimmers or house light contactors directly.

In general, pulse operated dimming circuits are preferred because any number of auxiliary momentary activated switches can then be wired in parallel to provide remote/emergency house light control.

2.6.1 SHORT PULSE OUTPUT

If the dimmer control has internal latching provisions, then short pulses can be used to drive the lights up or down. Figure 2-1 shows a simplified schematic of the house light control circuit for short pulse output. Note that for this mode, no jumper plug is used in J-3.



2-5

NOTE: NO JUMPER PLUG REQUIRED FOR J-3 FOR SHORT PULSE OPERATION

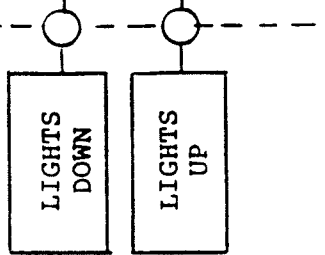


FIGURE 2-1
HOUSE LIGHTS CONTROL
SHORT PULSE OUTPUT

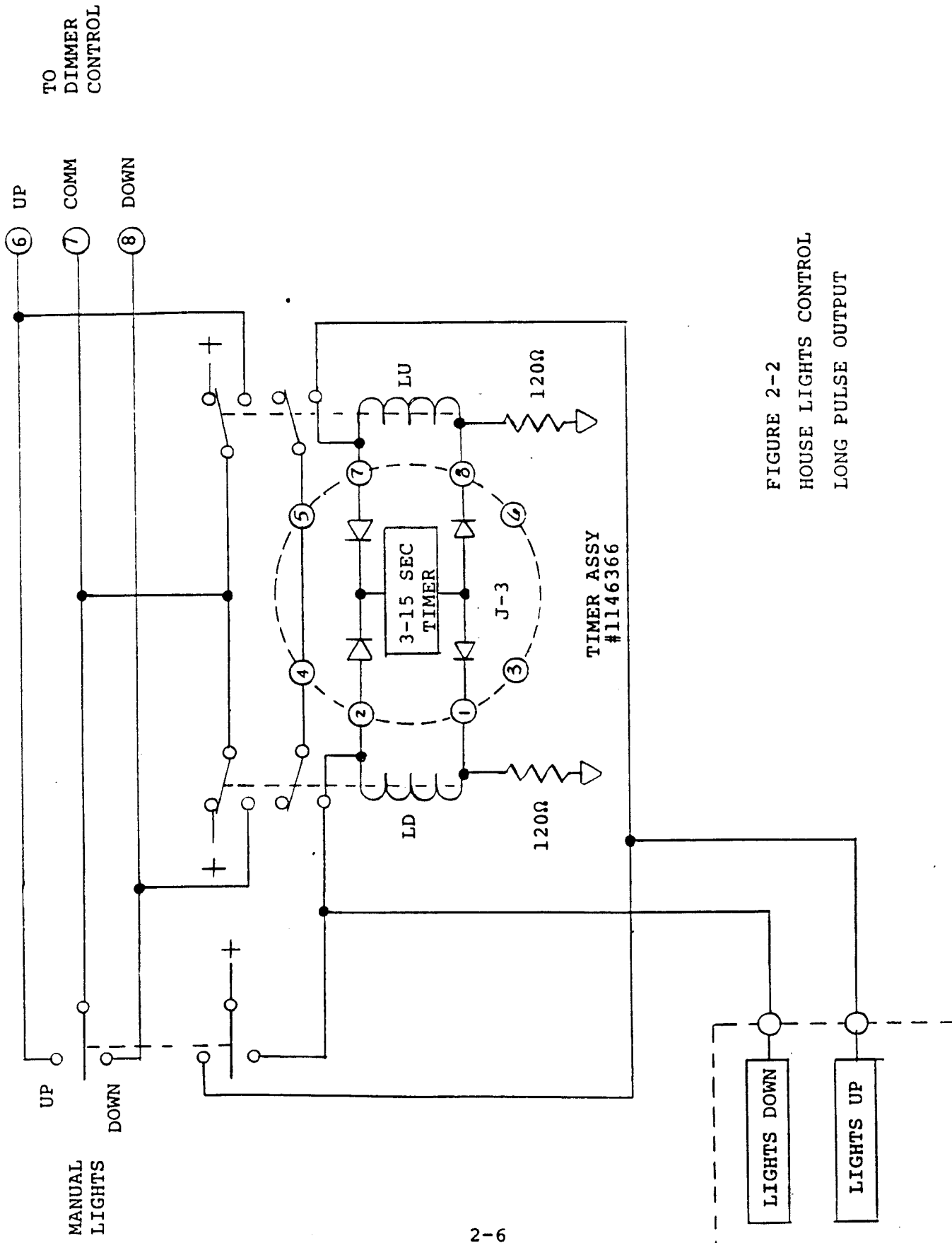
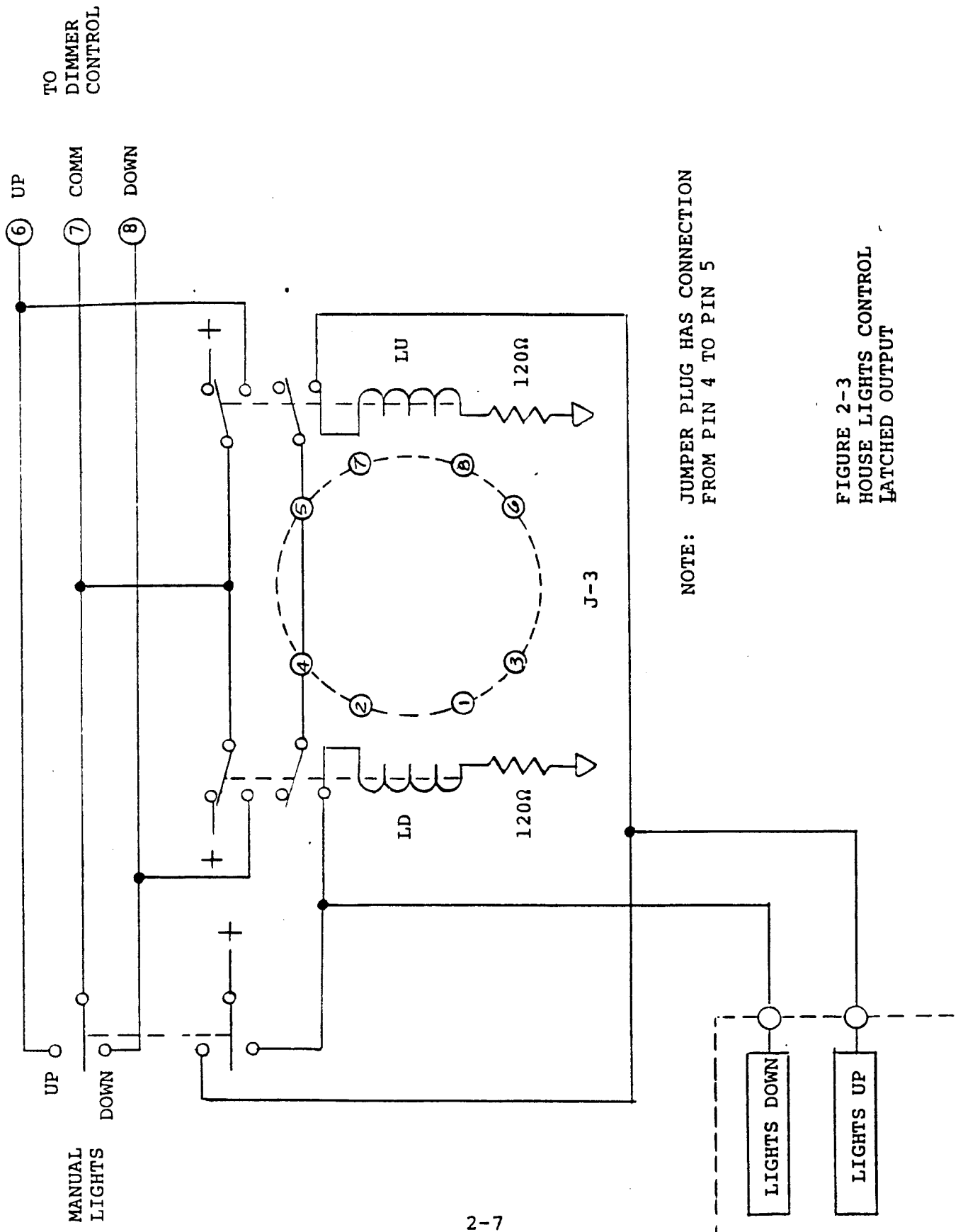


FIGURE 2-2
HOUSE LIGHTS CONTROL
LONG PULSE OUTPUT



2-7

FIGURE 2-3
HOUSE LIGHTS CONTROL
LATCHED OUTPUT

2.6.2 LONG PULSE OUTPUT

Motor controlled dimmers (such as Superior Luxtrol controls) with high and low limit switches but without latching provisions require contact closures as long as the dimmer cycle time. If auxiliary switches are required, then either a latching relay can be added to the dimmer or an optional timer (#1146366) can be plugged into J-3 to provide long output pulses. This timer is adjustable from about 3 to 15 seconds by a screwdriver adjustable pot. Figure 2-2 shows a simplified schematic for this unit.

2.6.3 LATCHED OUTPUT

Figure 2-3 shows the required jumper for J-3 to provide a latched output.

A latched output is used with motor controlled dimmers (e.g. Superior Luxtrol dimmer) which have high and low limit switches, but without external latching provisions, and when external override house light control is unnecessary. This configuration is also used with certain dimmers (e.g., Hunt Electric) which require a single maintained contact closure to turn the house lights down.

Note that with no power applied, neither relay is pulled in. When automation power is first turned on, a light up pulse is generated which will latch in the "LU" relay. Consult the factory for any special house light circuits not covered above.

2.7 SEN-SAFE INSTALLATION

The ORC sen-safe (cue detector/fail safe) mounts between the soundhead and the lower reel arm as shown in Figure 2-4. After mounting as shown, thread the film in the

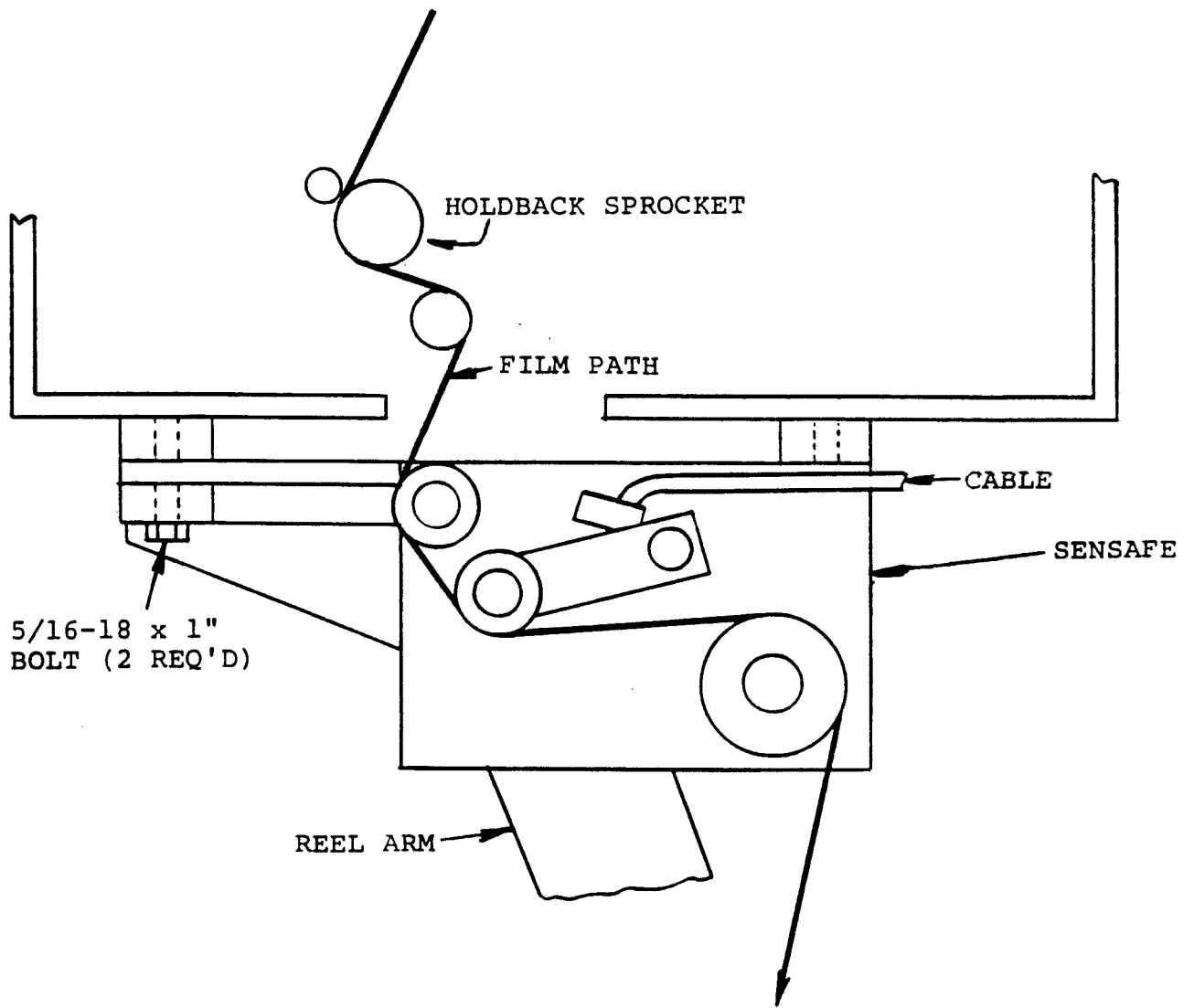


FIGURE 2-4

SENSAFE INSTALLATION

sound head and sen-safe assembly for final alignment. Route the wires out of the way of the film path and take-up belts. Connections are to TB4 1-5 as shown on the schematic.

2.8 INSTALLATION SYNCHRONOUS CONTROL BOX (SY-101)

The SY-101 is designed for wall mounting mid-way between the two systems to be synchronized. Refer to Drawing #1156120 (conduit and wiring layout) for a typical installation. Drawing #1146114 (schematic - sync control box and interconnecting wiring) shows how to connect the prefabricated cables from each VA-101-01 automation (low voltage cables) to the SY-101 as well as the selsyn wiring (high voltage cables). Note that the selsyn connectors are optional and the selsyn power should be connected at one system only.

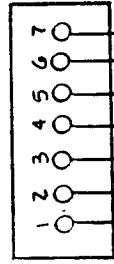
2.9 INSTALLATION STATUS BOX (ST-101)

The ST-101 status indicator box should be mounted in a location visible from all normal operating locations, usually a position directly above the sync box at eye level is best. Only two low voltage wires are required between each automation unit and the ST-101. A common wire from TB-4-11 (in the ORCON II) is connected to Terminal #7 in the ST-101 and a hot wire from TB-4-12 is connected to the ST-101 terminal corresponding to the theatre number. Refer to Figure 2-5.

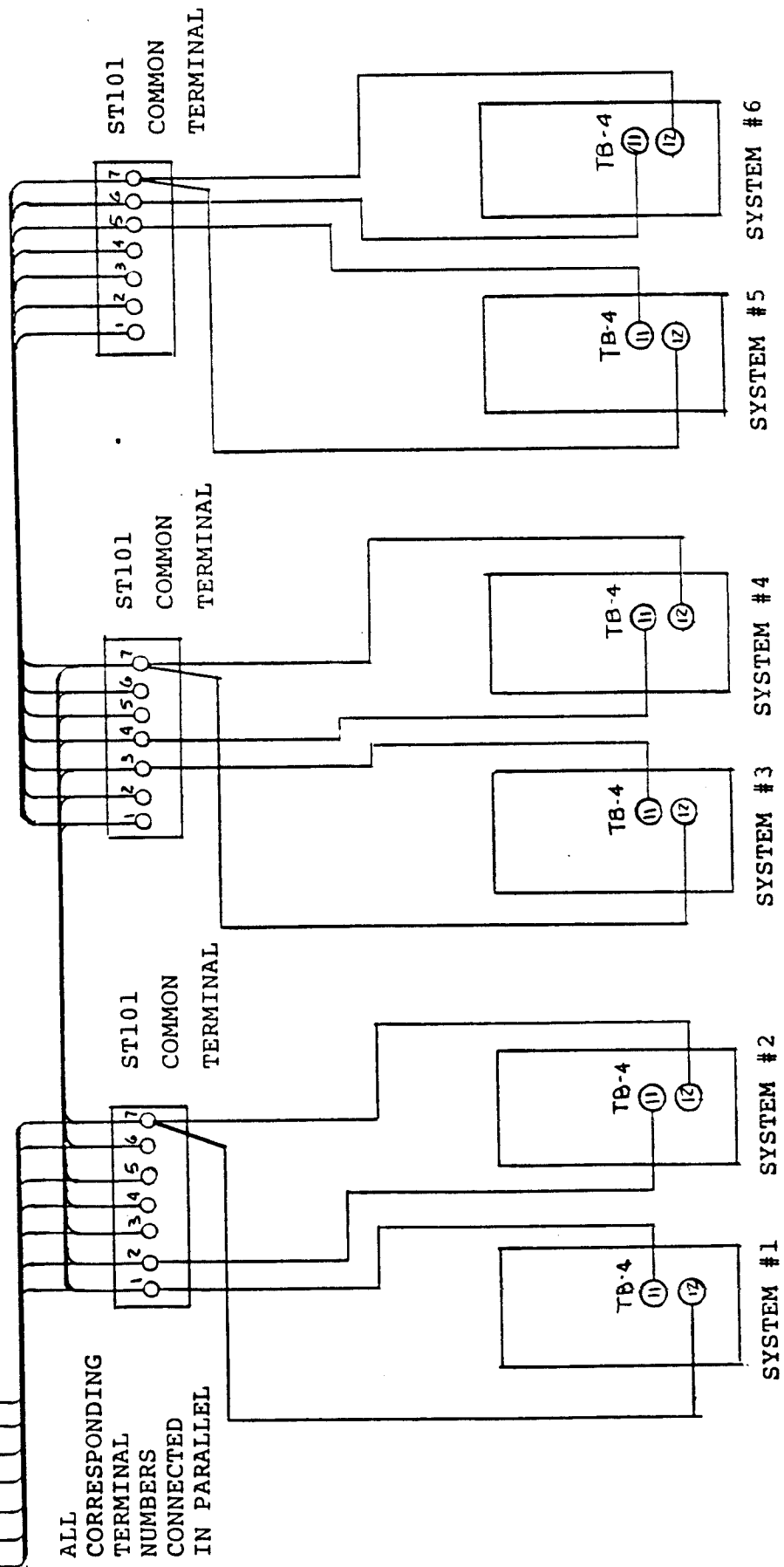
2.10 INSTALLATION REMOTE STATUS BOX (SR-101)

The wiring for the SR-101 remote status box is identical to that of the ST-101, and is shown in Figure 2-5.

REMOTE STATUS
SR101



7 #22 AWG WIRE
BELDEN CABLE #9430



ALL
CORRESPONDING
TERMINAL
NUMBERS
CONNECTED
IN PARALLEL

NOTE: ALL WIRING CAN BE LOW VOLTAGE
(NEMA CLASS 2) WIRING

FIGURE 2-5
ST101, SR101 INTERCONNECTING WIRING

3.1 GENERAL

Before switching power on, make sure that the equipment has been properly installed and the proper connections made in order to prevent possible damage. It may be helpful to remove the synchronous plug in J-2 (if used) for the initial checkout.

3.2 Figure 3-1 shows the front panel of the VA-101-01 with a general description of each feature.

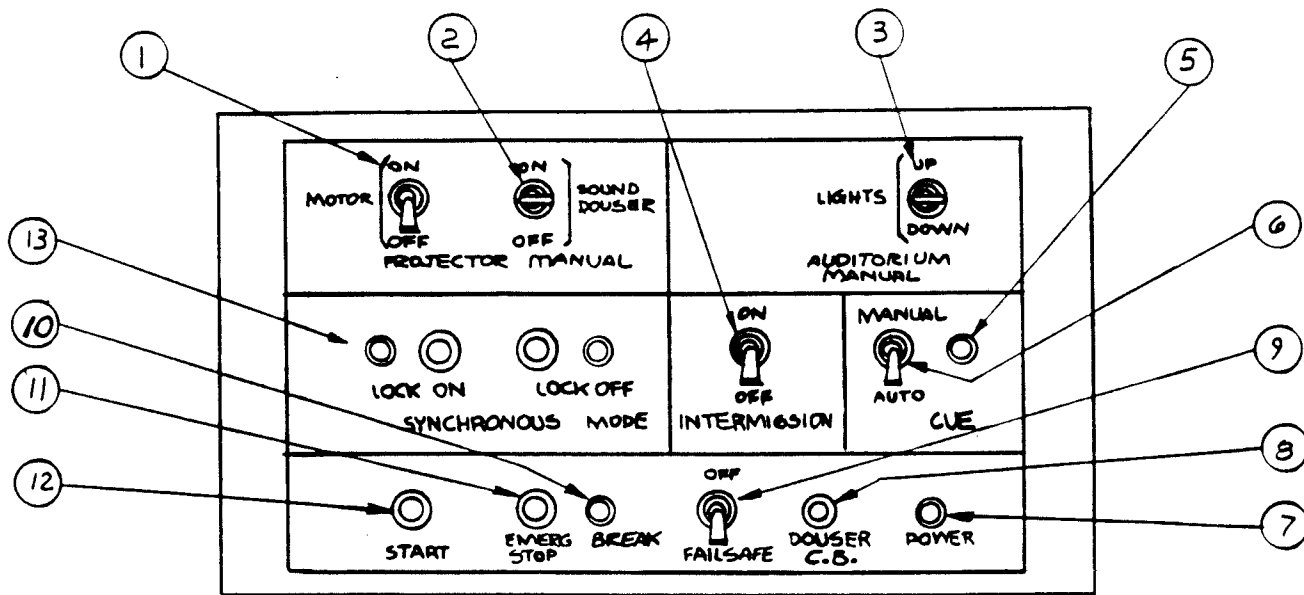
3.3 PRELIMINARY TESTING

With the automation power off, check to see that the manual functions (projector motor, douser and house lights) function correctly. Apply automation power and observe that the "power" indicator lights. Check sen-safe operation by noting that the "break" light comes on with either (or both) arms in the down position.

3.4 TIMER ADJUSTMENT

Pull automation unit out so as to expose timer board. The first LED (light emitting diode) is the delay time for the house lights down; the second is for the picture on (douser open); the third is the lights up; and the fourth, is douser close. When these LED's go off, a pulse is generated for the respective function. Press the start switch and note the first two LED's light.

The start switch can be repeatedly depressed for the following adjustments. Adjust the time of the first timer (with the trim-pot) to correspond to the desired lights down cycle and the second timer (picture-on) to the standard 7-second interval. This may be



1. Manual projector motor switch. In sync mode will unlock selsyns.
2. Manual douser and sound (exciter-lamp relay) switch.
3. Manual house lights switch.
4. Intermision (also called split-show) selector. Senses IB or OB cue and shuts motor off without film running out.
5. Light indicates passage of cue foil.
6. Normally in down position to detect cue. Use center position to defeat cue and top (momentary) position for a manual cue.
7. Power indicator shows that automation power supply is functioning. Comes on with automation circuit breaker.
8. Circuit breaker protects douser from excessive duty-cycle operation.
9. Failsafe override switch. Normal position is down. Switch to "OFF" when running projector w/o film for testing, etc.
10. Light indicates when there is a film break or when no film is loaded through failsafe.
11. Switch used to shut down projector in the event of a malfunction. House lights automatically come up. Also shuts off film break alarm.
12. Switch to start show. In non-synchronous operation will start lights-down, pix-on timers. Will also shut off film break alarm. "START" will not work with "LOCK OFF" lit.
13. Press and rotate either projector until "LOCK OFF" light extinguishes.
14. Note "LOCK ON/LOCK OFF" lights and switches work only in synchronous mode (selected on SY101).

FIGURE 3-1
VA101-01 FRONT PANEL
3-2

increased to accommodate slow light dimmers if desired.

Next, activate the manual cue switch to set timers three and four to the desired cycle times. Timer 4 (picture off) is normally also set to 7 seconds.

3.5 SINGLE PROJECTOR OPERATION

Table 3-1 shows the operational sequence for a normal (i.e., no intermission) show. Table 3-2 shows the intermission mode of operation. Either an in-board or out-board cue will trigger an intermission, but if an I.B. cue is used, the intermission can be bypassed as is sometimes desired for the night's final show, by switching the "intermission" switch to OFF. Table 3-3 shows the most likely abnormal conditions and their results.

3.6 TWO PROJECTOR, SYNCHRONOUS OPERATION

Tables 3-4, 5, and 6 show the operational sequence for the synchronous mode of operation. This mode is selected on the SY-101 "Normal/Sync" mode selector. The important thing to note is that a film cue at the start of the film is used to initiate the house lights down and picture-on timers.

3.7 CUE FOIL PLACEMENT

Figure 3-2 shows the normal cue foil placement for either an intermission or an end of show. With the picture-off timer set to 7 seconds, and at a standard film speed of 18 inches per second, these cues should be placed about 10.5 feet before the end of the picture.

The O.B. foil cue is also used to start the timers in the synchronous mode. It is usually placed about 8 feet before the picture start, depending on the starting characteristics of the projector motor.

FEED REEL
(Upper)

Sound Track

PICTURE APERTURE

Aperture/Foil distance normally 28 to 30 inches

In/Bd. CUE - used to program a masking
change or curtain close in.

Proximity CUE-used to program an Intermission
(Split Show) in the middle of a show or
between features on a platter. May be
by-passed when desired by "Intermission"
switch on control panel.

Out/Bd. CUE - used to end show when normal
'run-out' close down is desired. Can also
be used for an intermission.

Sen/Safe rollers

Length of Cue Foil should be at least
4 frames long to ensure reliable cue
sensing. Foil should be at the Sen/Safe
when the last few frames of picture
are in the aperture. Foil should be
wrapped around the edge of the film,
from the outside of the sprocket holes
on one side to the outside edge of
the holes on the other side.

TAKEUP
(Lower)

Direction
of film
travel

FIGURE 3-2

CUE FOIL PLACEMENT

SINGLE PROJECTOR OPERATION (NON-SYNC MODE)

Table 3-1 "Normal" Operation

SYSTEM STATE	CONTROL OR SIGNAL	STATUS	NOTES
1	Depress "START"	Projector ON. Lamp ON.	START SWITCH resets cue and film -break signals.
2 (Feature Starts)		House lights down, 1-15 sec after start. Non-sync sound OFF) 7 sec (adj.) Picture & sound ON) after start.	System disregards any fail-safe or cue signals until picture is on (0-7 sec).
3 (Feature on)		View entire feature.	
4 (Intermission)	Outboard cue #1 (system will ignore any cues that occur before the picture comes on)	House lights up, 1-15 sec after cue. Picture & sound OFF) 7 sec (adj) Non-sync sound ON .) after cue. Intermission Cue" signal to status panel.	Non-sync sound fades in with optional ORC fade-in module.
5	Film run-out (fail safe)	Projector and lamp OFF	Film is clear of projector.

SINGLE PROJECTOR OPERATION (NON-SYNC MODE) CONT'D

Table 3-2, Intermission ("Split-Show") Operation

SYSTEM STATE	CONTROL OR SIGNAL	STATUS	NOTES
1-4		SAME AS TABLE 3-1	
5	Either Cue I.B. or O.B. cue can be used.	Projector and lamp off with "PIX-OFF" (douser closed)	No run-out signal required to stop projector.
6 (2nd feature on)	START	Second feature can now be started. Operation repeats prior System States 1-5.	"Intermission" switch is now placed in "NORMAL" so that film clears projector.

Table 3-3. Abnormal Conditions

SYSTEM STATE AS SHOWN ABOVE	ABNORMAL CONDITION	RESULT	STEPS REQUIRED TO RETURN TO NORMAL
1-3 (Table 3-1 & 3-2. From proj. "ON" to end of feature.)	Film handling problem; operator depresses "STOP" button.	<ol style="list-style-type: none"> 1. Machine stops 2. House lights up 3. Non-sync sound on. 4. All timers reset 	<ol style="list-style-type: none"> 1. Fix problem 2. Depress "START"
2-3 (Table 3-1 & 3-2. Picture "on" to end of feature.)	Film breaks Note: System ignores fail-safe signal at start to prevent false alarms until film stabilizes.	<ol style="list-style-type: none"> 1. Machine stops 2. House lights up 3. Non-sync sound on 4. Film break alarm on 	<ol style="list-style-type: none"> 1. Depress "STOP" to shut alarm OFF (optional) 2. Fix problem 3. Depress "START" (this also resets alarm)

DUAL PROJECTOR OPERATION (SYNC MODE)

Table 3-4. "Normal" Operation

SYSTEM STATE	CONTROL OR SIGNAL	PROJECTOR 1 STATUS	PROJECTOR 2 STATUS	NOTES
1a (set up)		Thread Projector 1	Thread Projector 2	"LOCK OFF" light on.
1b (sync)	Depress "LOCK ON"	Rotate either projector until lock is achieved.		"LOCK OFF" light goes out.
2 (start projectors)	"START" (either console)	Both projector motors start (in sync). Alarms are reset for both machines	Both projector motors start (in sync). Alarms are reset for both machines	Projectors won't start unless in "LOCK"
3a (House 1 start)	Film Cue #1	House lights down) 1-15 sec Non Sync Sound off) after cue Pix & Sound on) 7 sec (adj) Alert for cue #2) after cue		
3b (House 2 start)	Film Cue #1		House lights down) 1-15 sec Non Sync Sound off) after cue Pix & Sound on) 7 sec (adj) Alert for cue #2) after cue	
4		View entire feature	View entire feature	
5a (Intermission House 1)	Film Cue #2	House lights up) 1-15 sec after cue 2 Pix, Sound off) 1-15 sec Non Sync Sound on) after cue 2		Projector 1 Intermission cue output to status indicators.
5b (Intermission House 2)	Film Cue #2		House lights up) 1-15 sec after cue 2 Pix, Sound off) 1-15 sec Non Sync Sound on) after cue 2	Projector 2 Intermission cue output to status indicators.
6a	Film run-out (fail-safe switch)	Projector, Lamp 1 off and Selsyns <u>unlock</u>		
6b	Film run-out (fail-safe switch)		Projector, Lamp 2 <u>off</u>	

DUAL PROJECTOR OPERATION (SYNC MODE) CONT'D

Table 3-5 INTERMISSION ("SPLIT-SHOW") OPERATION

SYSTEM STATE	CONTROL OR SIGNAL	PROJECTOR 1 STATUS	PROJECTOR 2 STATUS	NOTES
1 - 5b		SAME AS TABLE 3-4		Intermission switch on Machine #2 placed in SPLIT SHOW
6a (End of 1st feature Theatre 1)		Projector 1 runs until Projector 2 shuts off.		
6b (End of 1st feature, Theatre 2)			Projector 1 and 2 shut down together when #2 douser closes.	Selsyns remain locked.
7 Second Feature	START	Same as System State 2 - 6b above		Intermission switch should be placed in "NORMAL"

Table 3-6. ABNORMAL CONDITION

STATE	ABNORMAL CONDITION	RESULT	STEPS REQ'D TO RETURN TO NORMAL
2-5 (Table 3-4 From Projectors "ON" to end of feature)	Film handling problem; operator depresses "STOP" on either machine.	<ol style="list-style-type: none"> Both machines stop in sync. House lights up. Non-sync sound on. Timers reset. 	<ol style="list-style-type: none"> Fix problem Depress "START" (either mach) Depress "CUE" on both controls to restart shows.
3-5 (Table 3-4 pictures "ON" to end of feature)	Film breaks.	1. Film break alarm - same as above.	<ol style="list-style-type: none"> Depress "STOP" to shut alarm Fix break*. Depress "START" (this will also reset alarm).

*Note that if it is found necessary to manually run a projector to fix a problem, then the Selsyns will automatically unlock. It will of course be necessary to relock the motors before a restart can be effected.

SECTION 4 - MAINTENANCE

4. MAINTENANCE

Periodically inspect the "sen-safe" assembly for accumulated dirt or oil deposits. Clean if necessary with alcohol or an aerosol cleaner such as G.C. "Dry Clean" (#8669).

SECTION 5 - TROUBLESHOOTING - THEORY OF OPERATION

5.1 RELAY FUNCTIONS

Since many automation problems can be traced to faulty relay operation, an understanding of the function of each relay is essential when troubleshooting. Table 5-1 lists each relay's function in the VA-101-01.

TABLE 5-1. RELAY FUNCTIONS

1. "LD" (Lights Down) receives pulse from timer #1. Contacts drive house lights down. Can be wired for pulse or latched operation. See Section 2.6.
2. "LU" (Lights Up) receives pulse from timer #3. Contacts drive house lights up. See Section 2.6.
3. "PO" (Pulse On) receives pulse from timer #2. Contacts open douser and unlatch "EX" relay.
4. "PF" (Picture OFF) receives pulse from timer #4. Contacts close douser and latches "EX" relay.
5. "EX" (Exciter Lamp) latched on by "PF" and unlatched by "PO" relay. Normally closed. Contacts drive exciter lamp thus providing "fail-safe" operation for the picture sound. The normally open contacts enable the non-sync sound circuit either by the fade-in circuit of the VS-250 sound system, or by energizing a non-sync (e.g., tape deck) sound source.

6. "ML" (Motor/Lamp) controlled by the timer board. Contacts operate projector motor and xenon lamp.
7. "SL" (Start Latch) latched on with the picture on (douser open) pulse from timer #2. It stays latched until reset with either the "START" or "EMERGENCY STOP" switches. Contacts 2, 6, 10, direct the cue signal to either the start timers (sync mode only), or to the stop timers (#3 and #4). Contacts 5 and 9 inhibit the fail safe until the picture is on screen to prevent any false alarms due to fail safe bounce. This feature can be bypassed if desired by jumpering pin 9 to 5.
8. "CL" (Cue Latch) is locked on when an end-of-show or intermission cue is received. Unlatching is the same as the "SL" relay. Contacts 11 and 7 provide negative pulses from the power board to the alarm output. Contacts 10 and 6 unlock selsyns (sync mode only) when the first projector runs out of film at the end of show. Contact 10 and 2 conducts a stop signal to the common stop line if the film break switch activates before the end-of-show cue. Contacts 1 and 9 bring up the second house if the first projector is mistakenly placed in the "Intermission" position.
9. "AL" (Alarm Latch) latches in when the film break switch activates. Unlatching is the same as the "SL" and "CL" relays. Contacts 9 and 5 provide positive output pulses to the alarm output.

5.2 TIMER BOARD OPERATION

Refer to the automation Schematic #1145990 and the timer board Schematic 1146053 for the following discussion.

5.2.1 TIMER #1 "LD" (LIGHTS DOWN)

This timer has three main active components; an SCR (Q-2), a trigger diode (Q-15), and a darlington transistor (Q-1). A start pulse at R7 triggers Q-2 on causing a voltage drop across R1, R2, and R3, of about 18 volts. Capacitor C-1 charges at a rate determined by the setting of pot R3 and when the voltage across C-1 reaches 8 volts, Q-15 conducts and dumps some of C-1's charge into C-2. C-2 now discharges thru R-5, R-6, and the base-emitter junction of Q-1 causing it to turn on thus generating the "LD" output pulse (about +26 volts). Q-2 is reset (turned off) by this pulse thru D-4. Q-2 can also be reset by a stop signal thru D-36.

Light emitting diode D-3 is turned on during the timing interval and is turned off at the beginning of the output pulse. The output pulse length can be adjusted by changing R-6, if desired.

5.2.2 TIMER #2 "PO" (PICTURE-ON)

This timer is identical to the "LD" timer.

5.2.3 TIMER #3 "LU" (LIGHTS UP) AND TIMER #4 "PF" (PICTURE-OFF)

Operation of these timers is identical to the "LD" timer with the following exceptions.

1. These timers are triggered from the end-of-show, or intermission film cue.
2. They are not reset by a "STOP" command.
3. A "STOP" command generates an output pulse by Q-14 and associated circuitry .

4. Both timers give an output pulse when the automation is first turned on (R55, C19).

5.2.4 START DISABLE GATE

Transistor Q-9 is used as a gate allowing the "START" switch signal to pass to its collector unless a "LOCK-OFF" signal from the SY-101 or a "STOP" signal is present.

5.2.5 "DISSOLVE/ENABLE" GATES

In the normal mode, pin 6 of the timer board is low allowing the "START" switch signal to pass thru Q-10 to trigger the "LD" and "PO" timers. In the synchronous mode, pin 6 is high (+27V) which prevents Q-10 from passing the signal while enabling Q-11. The "LD" and "PO" timers are now triggered by the first film cue (pin 7).

5.2.6 LATCH RESET GATE (Q-12)

This transistor is on (pin 19 at +27 volts) unless either the stop or start signal is present.

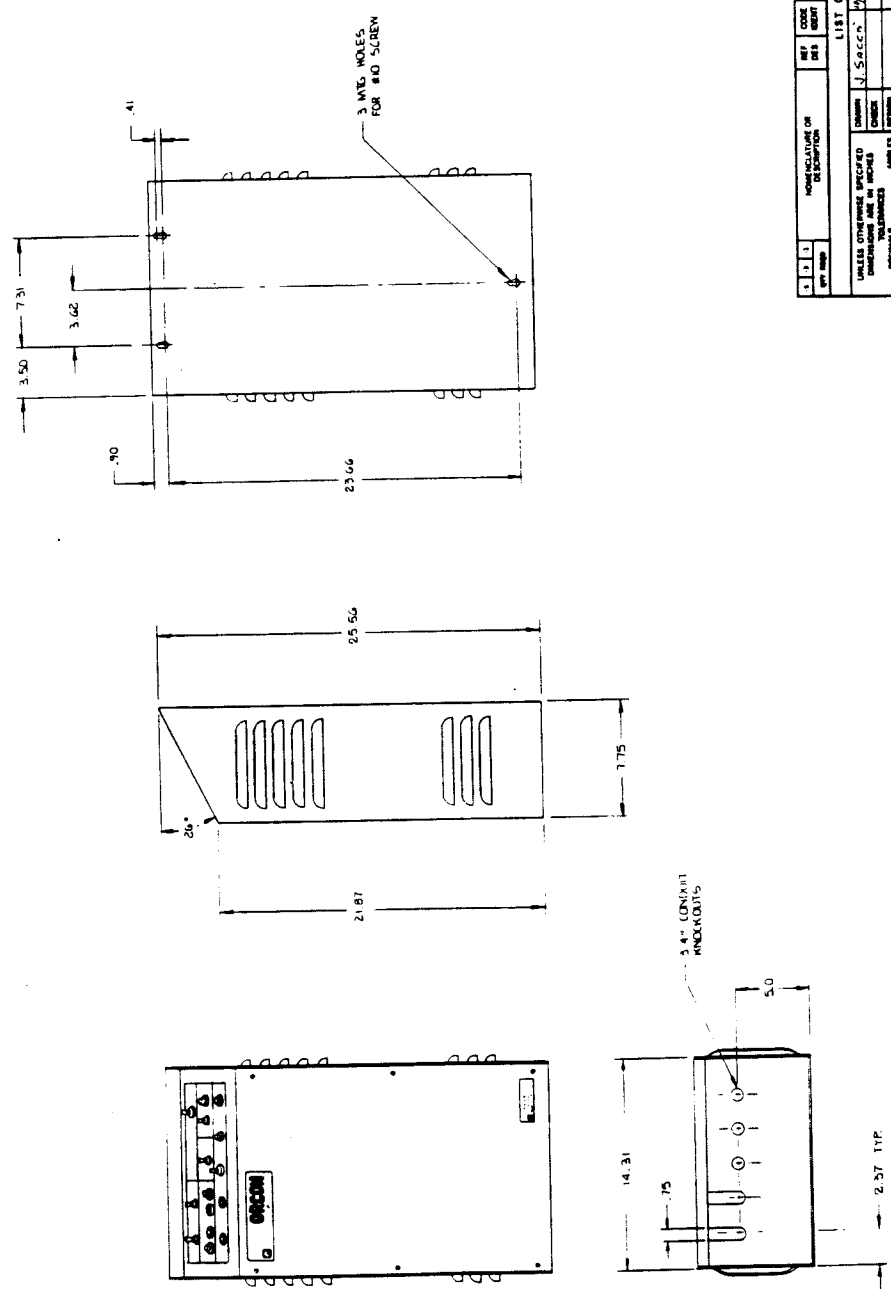
5.2.7 MOTOR STOP GATE (Q-13)

This transistor unlatches the "ML" relay with either a "STOP" signal, a "FILM BREAK" signal (pin 18), or in the Intermission Mode, a "PF" signal (pin 20).

WALL MOUNT VERSION

THE INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE. IT IS THE PROPERTY OF ORIGINATOR AND IS LOANED TO YOUR AGENCY; IT AND ITS CONTENTS ARE NOT TO BE DISTRIBUTED OUTSIDE YOUR AGENCY.

NOTES - UNLESS OTHERWISE SPECIFIED:
 1. REMOVE ALL BURRS AND SHARP EDGES.



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SYMBOL	DESCRIPTION	QUANTITY	UNIT	REVISIONS

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3	REVISED	11/22/57	W.P.S.

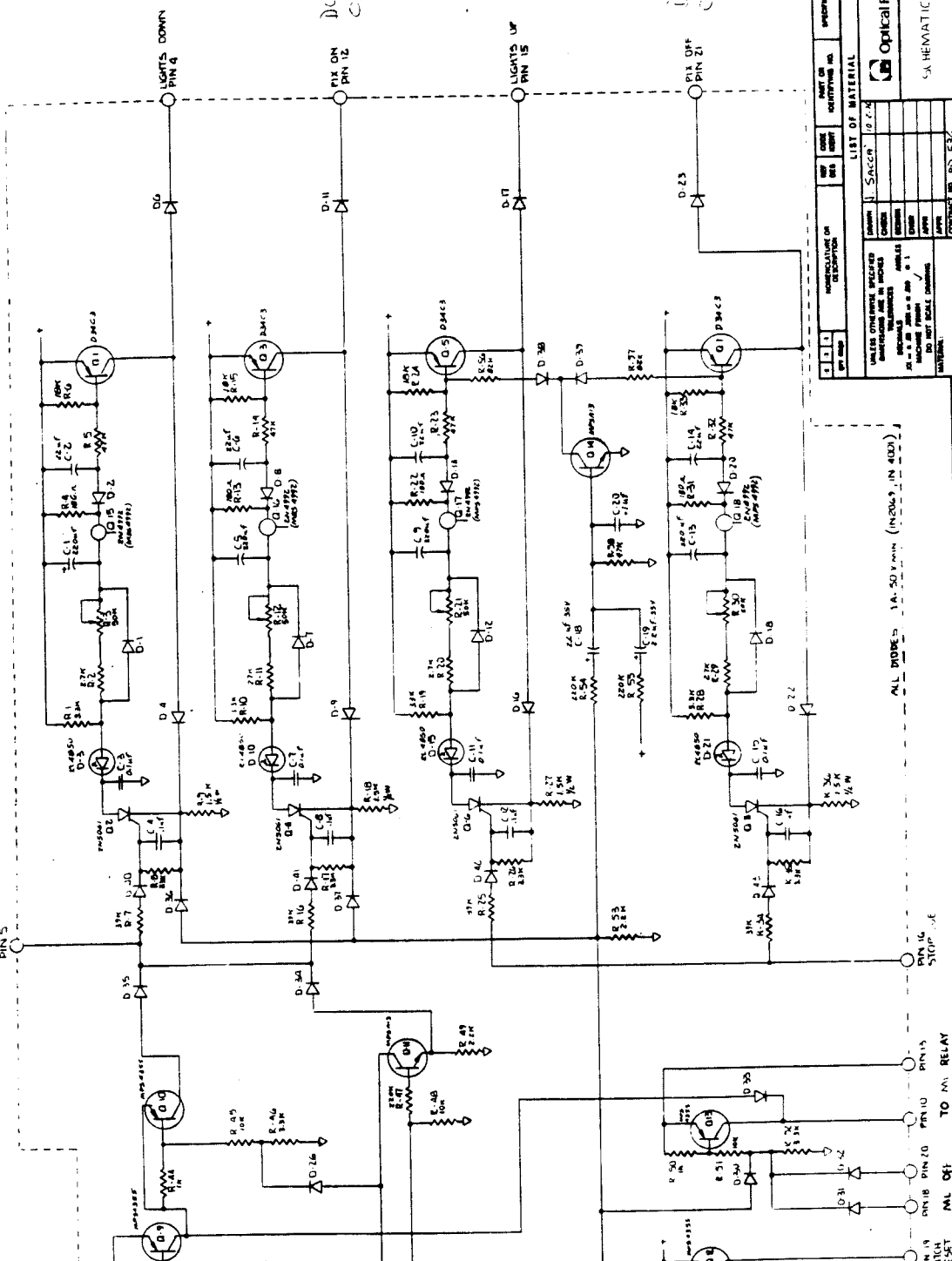
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NOTES - UNLESS OTHERWISE SPECIFIED:
 1. REMOVE ALL BARRIERS AND TRAMP CODES.



FOR REFERENCE:
 ASSY - 1146053

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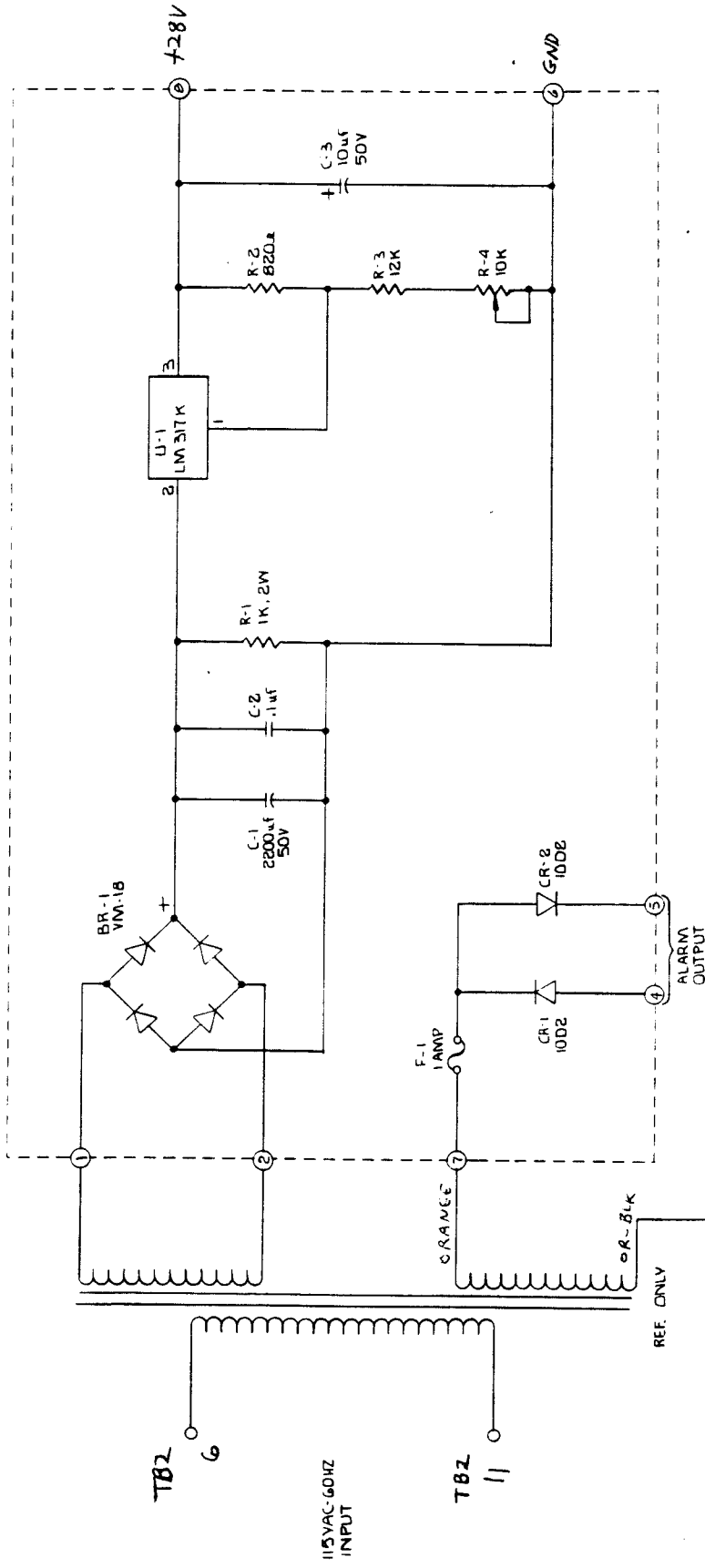
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 1. REMOVE ALL BURRS AND SHARP EDGES.



QTY	MOD	SYM	NOMENCLATURE OR DESCRIPTION	REF DES IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE	ZONE	ITEM NO.
1			BR-1 VM-16						
1			C-1 2200µF 50V						
1			C-2 .1µF						
1			C-3 10µF 50V						
1			R-1 1K.2W						
1			R-2 820Ω						
1			R-3 12K						
1			R-4 10K						
1			U-1 LM317K						

QTY	CASH NO.	NEAT ASSY	APPLICATION
			VA101
			USED ON

QTY	CASH NO.	NEAT ASSY	APPLICATION
			VA101
			USED ON

FOR REFERENCE
 DWG # 1146481 ASSY
 DWG # 1116479 ARTWORK

Optical Radiation Corporation
 VA 101 - AUTOMATION
 POWER SUPPLY SCHEMATIC

SIZE CODE IDENT NO. C 33030
 SCALE -- WEIGHT --
 REV N/C
 1136478

CONTRACT NO. PD 536
 APPROVED
 APPROVED

FINISH:
 APPROVED

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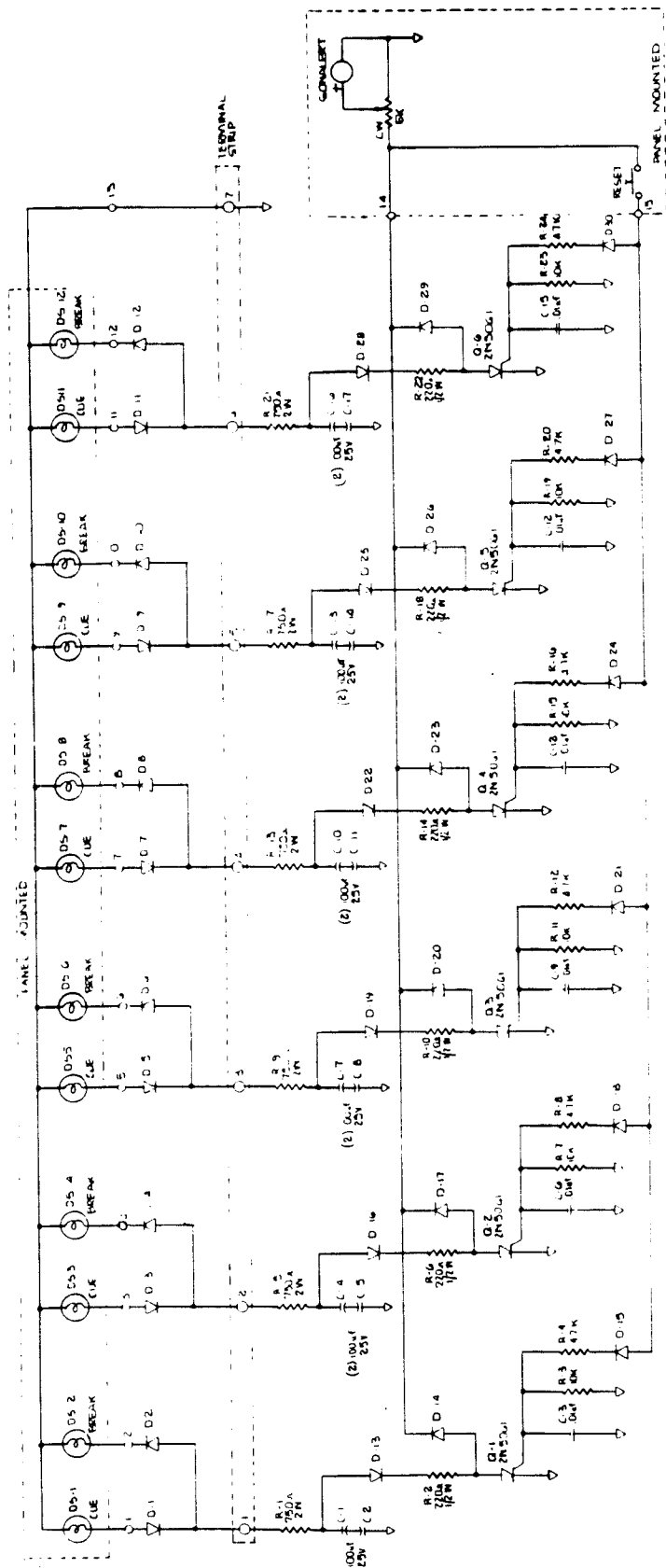
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ALL DIMENSIONS TO BE: 1 AMP 48V (-D2)

FOR REFERENCE: 115C50B
FINAL ASSY 8

NOTES - UNLESS OTHERWISE SPECIFIED:
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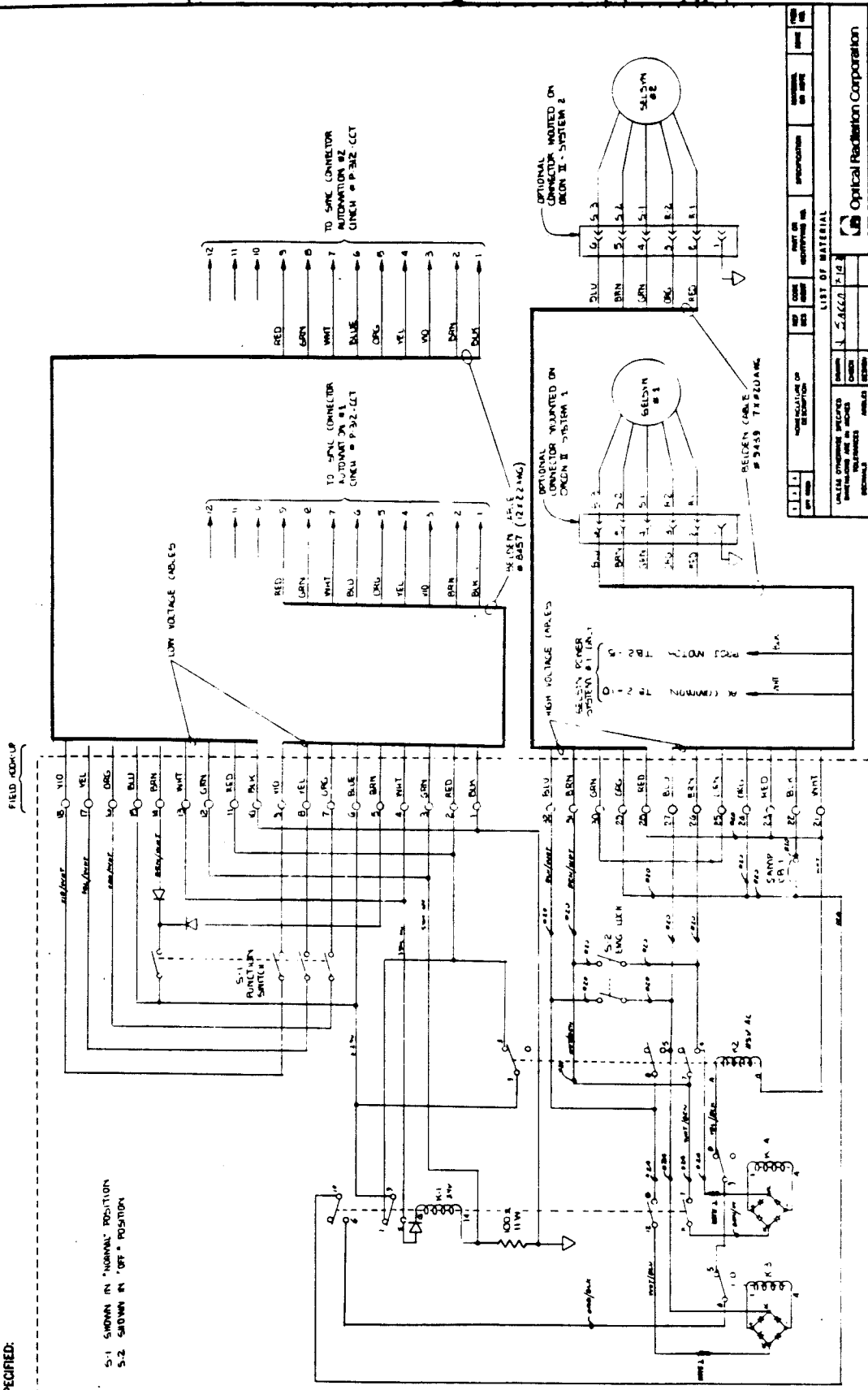
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1	10/15/54	INITIAL ISSUE
2	11/10/54	REVISED TO ADD WIRE 2



NOTES - UNLESS OTHERWISE SPECIFIED:
 1. ALL WIRES TO BE 24 AWG.
 2. ADD 2 RESISTORS (see 2nd) TO EACH WIRE TO PREVENT SHORTS.
 3. ALL WIRE ENDS TO BE STRIPPED TO 1/2 INCH.
 4. ALL WIRE ENDS TO BE TIGHTENED TO 1/2 INCH.
 5.1 SHOWN IN 'NORMAL' POSITION
 5.2 SHOWN IN 'OFF' POSITION

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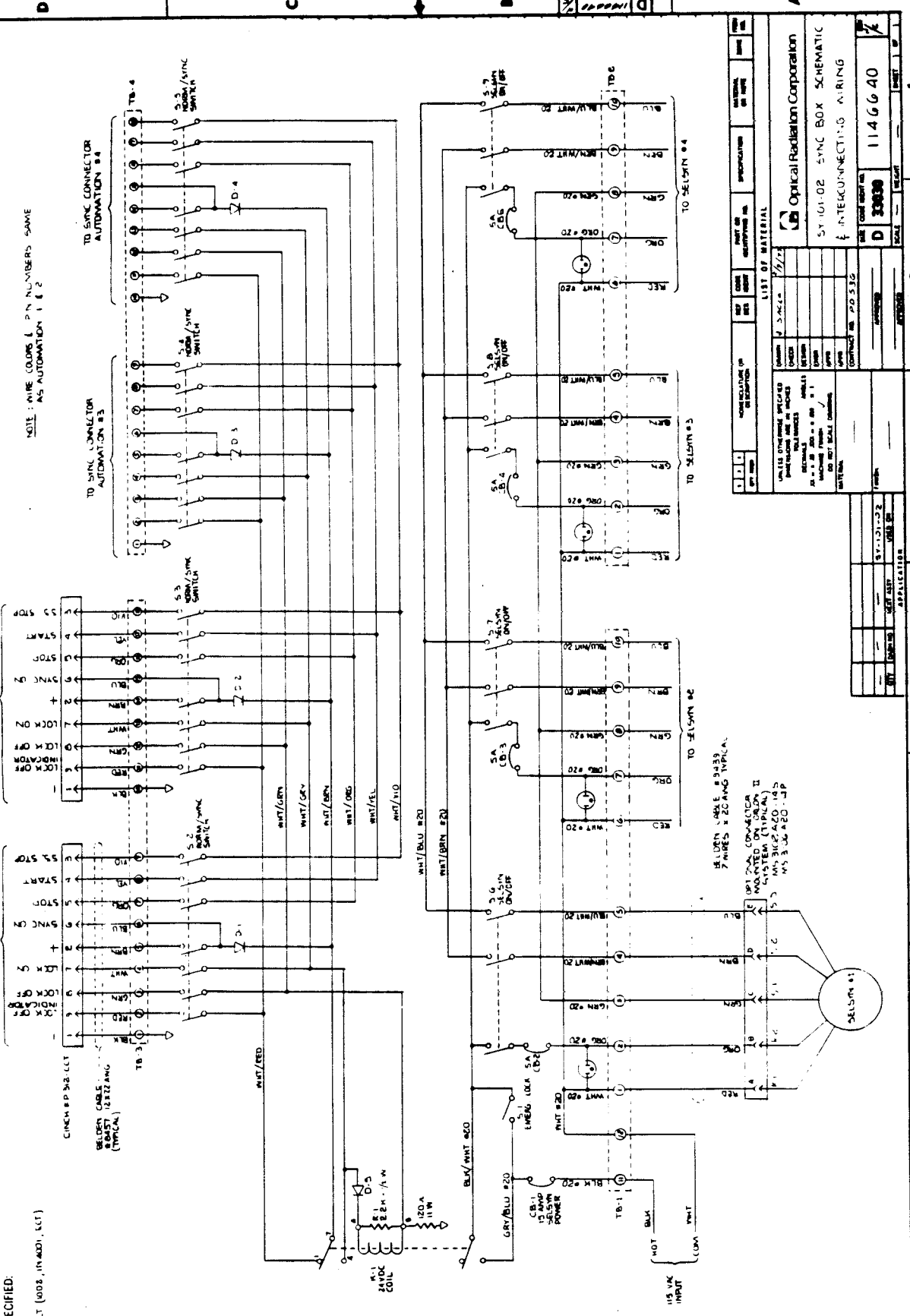
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NOTES - UNLESS OTHERWISE SPECIFIED:
 1. ALL WIRES TO BE 20 AWG
 2. ALL DIODES TO BE 1 AMP 50 VOLT (RDS, IN ADD, 51T)
 3. ALL DIODES TO BE 1 AMP 50 VOLT (RDS, IN ADD, 51T)



NOTE: WIRE COLORS & PIN NUMBERS SAME AS AUTOMATION 1 & 2

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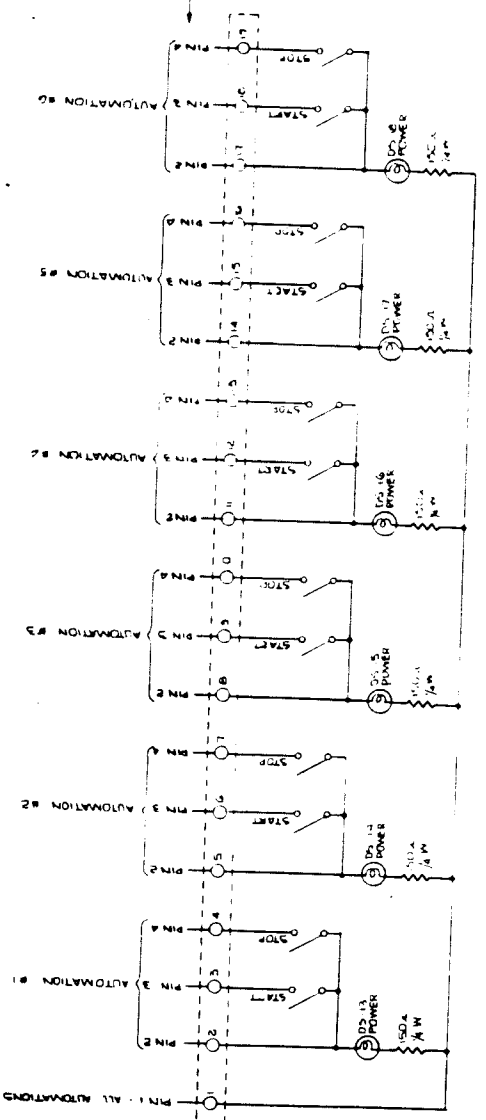
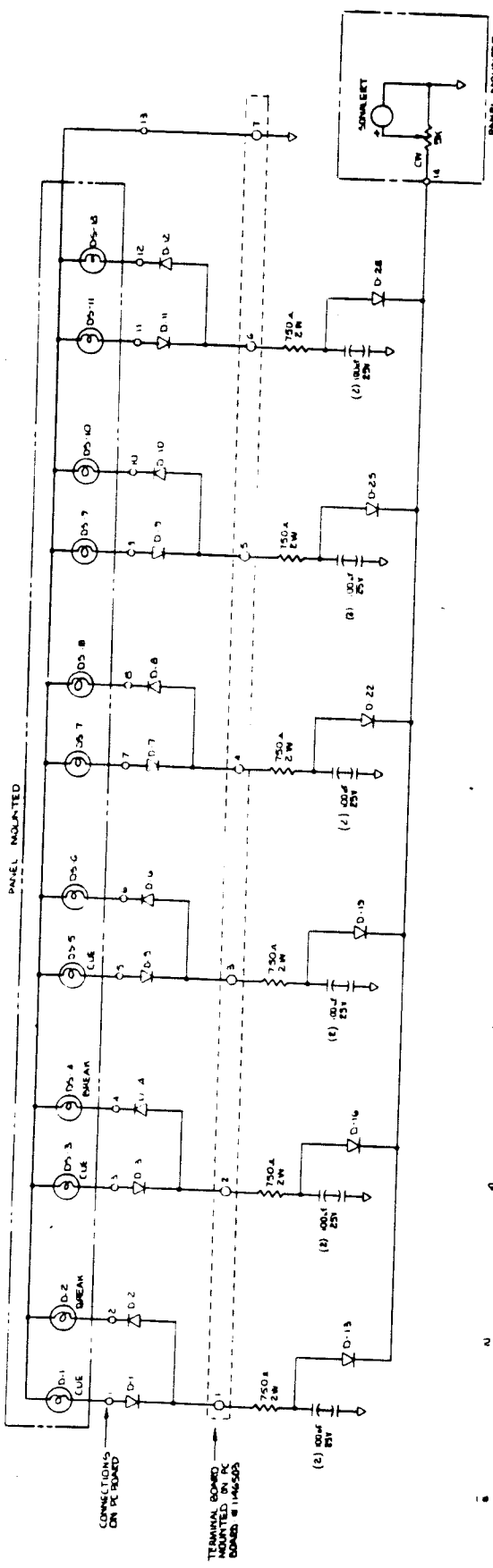
Optical Radiation Corporation
 SY-101-02 SYNC BOX SCHEMATIC
 INTERCONNECTING WIRING

DATE: 11/4/60
 DRAWING NO: 1146640

THESE WIRING CONNECTIONS ARE TO BE MADE BY THE INSTALLER. THE INSTALLER IS RESPONSIBLE FOR THE PROPER CONNECTION OF ALL WIRING TO THE TERMINAL BOARD. THE WIRING SHOULD BE MADE IN ACCORDANCE WITH THE WIRING DIAGRAM AND THE WIRING LIST. THE WIRING SHOULD BE MADE IN ACCORDANCE WITH THE WIRING DIAGRAM AND THE WIRING LIST. THE WIRING SHOULD BE MADE IN ACCORDANCE WITH THE WIRING DIAGRAM AND THE WIRING LIST.

NOTES - UNLESS OTHERWISE SPECIFIED:

- 1. ALL DIMENSIONS TO BE: UNLESS OTHERWISE SPECIFIED.



RESISTORS TO BE SUPPLIED FOR AUTOMATION #1 - #5

TERMINAL BOARD WIRING

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5				
6				
7				

NO.	DESCRIPTION	QTY.	REMARKS
1	RELAY (PANEL MOUNTED)	13	
2	DIODE (PANEL MOUNTED)	13	
3	RESISTOR (PANEL MOUNTED)	13	
4	RESISTOR (PANEL MOUNTED)	13	
5	RESISTOR (PANEL MOUNTED)	13	
6	RESISTOR (PANEL MOUNTED)	13	
7	RESISTOR (PANEL MOUNTED)	13	
8	RESISTOR (PANEL MOUNTED)	13	
9	RESISTOR (PANEL MOUNTED)	13	
10	RESISTOR (PANEL MOUNTED)	13	
11	RESISTOR (PANEL MOUNTED)	13	
12	RESISTOR (PANEL MOUNTED)	13	
13	RESISTOR (PANEL MOUNTED)	13	

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2	DIODE (PANEL MOUNTED)	13	
3	RESISTOR (PANEL MOUNTED)	13	
4	RESISTOR (PANEL MOUNTED)	13	
5	RESISTOR (PANEL MOUNTED)	13	
6	RESISTOR (PANEL MOUNTED)	13	
7	RESISTOR (PANEL MOUNTED)	13	
8	RESISTOR (PANEL MOUNTED)	13	
9	RESISTOR (PANEL MOUNTED)	13	
10	RESISTOR (PANEL MOUNTED)	13	
11	RESISTOR (PANEL MOUNTED)	13	
12	RESISTOR (PANEL MOUNTED)	13	
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7	RESISTOR (PANEL MOUNTED)	13	
8	RESISTOR (PANEL MOUNTED)	13	
9	RESISTOR (PANEL MOUNTED)	13	
10	RESISTOR (PANEL MOUNTED)	13	
11	RESISTOR (PANEL MOUNTED)	13	
12	RESISTOR (PANEL MOUNTED)	13	
13	RESISTOR (PANEL MOUNTED)	13	

Optical Radiation Corporation
 VR-101 02 REMOTE BOX SCHEMATIC
 D 30000 114 G G 98
 SCALE: 1/2" = 1"

NOTES - UNLESS OTHERWISE SPECIFIED:
 1. MAKEUP ALL BUNDLES AND SHARP EDGES

1. REMOTE FOR AIRLIFT...
 2. REMOTE FOR AIRLIFT...
 3. REMOTE FOR AIRLIFT...
 4. REMOTE FOR AIRLIFT...
 5. REMOTE FOR AIRLIFT...
 6. REMOTE FOR AIRLIFT...
 7. REMOTE FOR AIRLIFT...
 8. REMOTE FOR AIRLIFT...

AVAILABLE FOR REQUEST
 FOR ONE TO TWO SYSTEMS

STATUS INDICATOR
 CURE BREAK

TO SYSTEM #1 (IF USED)

TO SYSTEM #2 (IF USED)

TO SYSTEM #1 (IF USED)

TO SYSTEM #2 (IF USED)

TO SYSTEM #1 (IF USED)

TO SYSTEM #2 (IF USED)

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TO SYSTEM #1 (IF USED)

TO SYSTEM #2 (IF USED)

CLASS 2
 2 x 0.8 ANG (TYPICAL)
 1 COMMON (TO ALL UNITS)
 1 (CLASS 2) TIME CONTROL
 BELDEN BAST (12 #22)

SELECTOR MOTOR #1
 2.5 VAC (REQ ON THE
 SYSTEM ONLY) (7.00 ANG)
 W/ CONDUIT (TYPICAL)

5 WIRES FROM SELSYN MOTOR

USUAL 2 WIRES FROM
 COMMONER TERMINAL
 ON DRUM IN JUNCTION
 BOX - ONE SYSTEM ONLY

SYNCHRONOUS
 CONNECTION ON
 APPROXIMATELY 81
 (TYPICAL)

5 Wires from SELSYN MOTOR

SELSYN MOTOR #1 - 4 Wires AL (USUAL REQ USE SYSTEM ONLY)
 BELDEN #120 (7 #20 ANG) - W/ CONDUIT (TYPICAL)

1 V SYNCH CONTROL (TYPICAL)
 BELDEN BAST (12 #22 ANG)

REMOTE FOR AIRLIFT...
 WITH CONTROLS FOR 2 (MULTI) SYSTEMS

REMOTE CONTROL (TYPICAL)

THE REMOTE CONTROL BOX
 INCLUDES STATUS & ALARM FUNCTION
 REMOTE FOR AVAILABLE UPON REQUEST
 IN ONE BOX PERSON WITH CONTROLS
 FOR ANY NUMBER OF SYSTEMS (6 MAX)

LV (CLASS 2) REMOTE
 CONTROL CABLE NOT
 SUPPLIED BY DEC

WALL TROUBLE - HIGH VOLTAGE
 STOP SECTION - LOW VOLTAGE

EMERGENCY

SOUND SYSTEM

AUTOMATION

CONTROL PANEL

JUNCTION BOX

SYNCHRONOUS AUTOMATION

VA 100-01

VA 100-02

VA 100-03

VA 200-01

VA 200-02

VA 300-01

VA 300-02

VA 300-03

VA 300-04

VA 300-05

VA 300-06

VA 300-07

VA 300-08

VA 300-09

VA 300-10

VA 300-11

VA 300-12

VA 300-13

VA 300-14

VA 300-15

VA 300-16

VA 300-17

VA 300-18

VA 300-19

VA 300-20

VA 300-21

VA 100-01

VA 100-02

VA 100-03

VA 200-01

VA 200-02

VA 300-01

VA 300-02

VA 300-03

VA 300-04

VA 300-05

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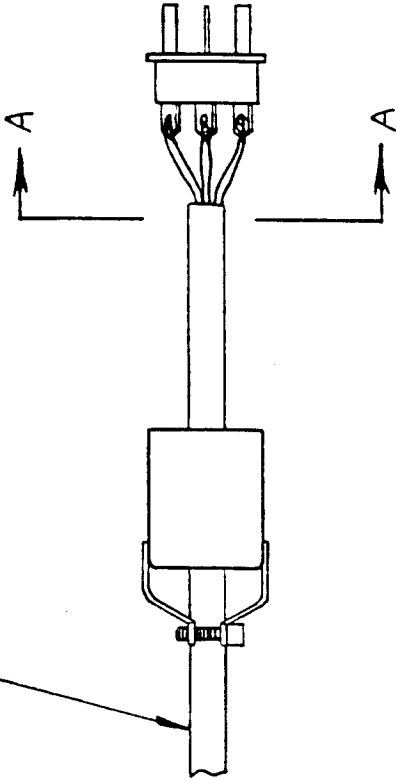
NOTES - UNLESS OTHERWISE SPECIFIED:

1-REMOVE ALL BORDERS AND DIMENSION LINES

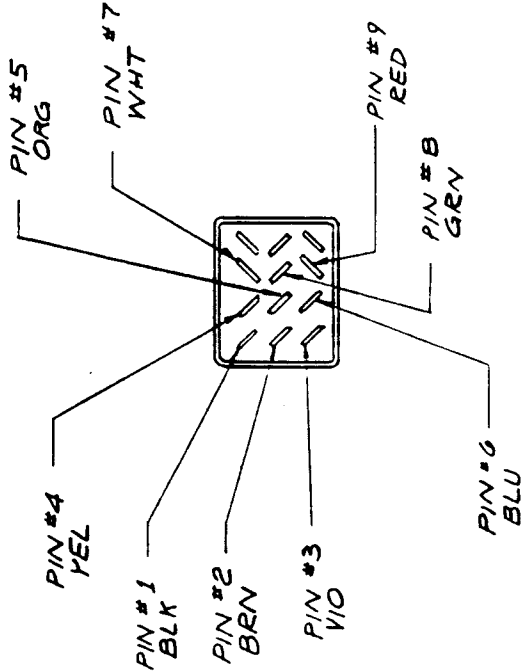
REVISIONS

ZONE	LYR	DESCRIPTION	DATE	APPROVED

BELDEN CABLE # 8457
30 FT LONG



CINCH # P-3/2-CCT
CONNECTOR



VIEW A-A

QTY	PART NO.	DESCRIPTION	NOTE	IDENT	ITEM
UNLESS OTHERWISE SPECIFIED					
DIMENSIONS ARE IN INCHES					
TOLERANCES					
DECIMALS					
ANGLES					
XX - 1/2 XXX - 1/10 1/12					
MACHINE FINISH					
DO NOT SCALE DRAWING					
MATERIAL					
NOTED					
FINISH					

QTY	DASH NO	FINAL	SY-101	USED ON	APPLICATION

SIZE	CODE	IDENT NO	DWG NO	REV	SHEET	OF
B	33030			1120504		
SCALE						
APPROVED						
CONTRACT NO. PD 536						
DRAWN V. SIREGA 11/21/73						
CHECK						
DESIGN						
ENGR						
APPR						

Optical Radiation Corporation
SYNC CONNECTOR, WIRING