

S1 = AMP# P1 = 64041 A

9.1 TO 22K 47-100K
 R1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 14, 17, 23, 24, 28, 81, 82, 83
 R7, 15, 16, 18, 26

ALL RESISTORS = 1/4W EXCEPT AS MARKED
 S5, S7 = 640441-4 } AMP
 P5, P7 = 640454-4 }

UNDERLINED NUMBERS BY CONNECTORS REFER TO PIN NUMBERS

ALL CAPS - 10V MINIMUM RATING

ALL CONNECTOR NUMBERS REFER TO "AMP" BRAND PRODUCTS

ALL NPN = 2N3904 EXCEPT Q7 = 2N3569
 ALL PNP = 2N3906
 ALL DIODES = 1N4148 EXCEPT D10-D14

LAST #
 IC9 R89 OPTO 8 S10
 Q19 C18 TR8 S8
 LED5 P1 T1 P9

S6A = AMP# 640441-5
 S6B = AMP# 640441-2
 S6C = AMP# 640441-3
 P6 = AMP# 1-640454-0
 PLUG END ON PCB S0

OCT. 17 FIRST JUNE

AUTO PROGRESSION S5 S6 S7

IC9 3900 OR 3401 VCC = +9V

IC5 4030 OR 4070

SA 3

SB 4

SC 10

SD 11

SE 12

SF 13

SG 14

SH 15

SI 16

SJ 17

SK 18

SL 19

SM 20

SN 21

SO 22

SP 23

SQ 24

SR 25

SS 26

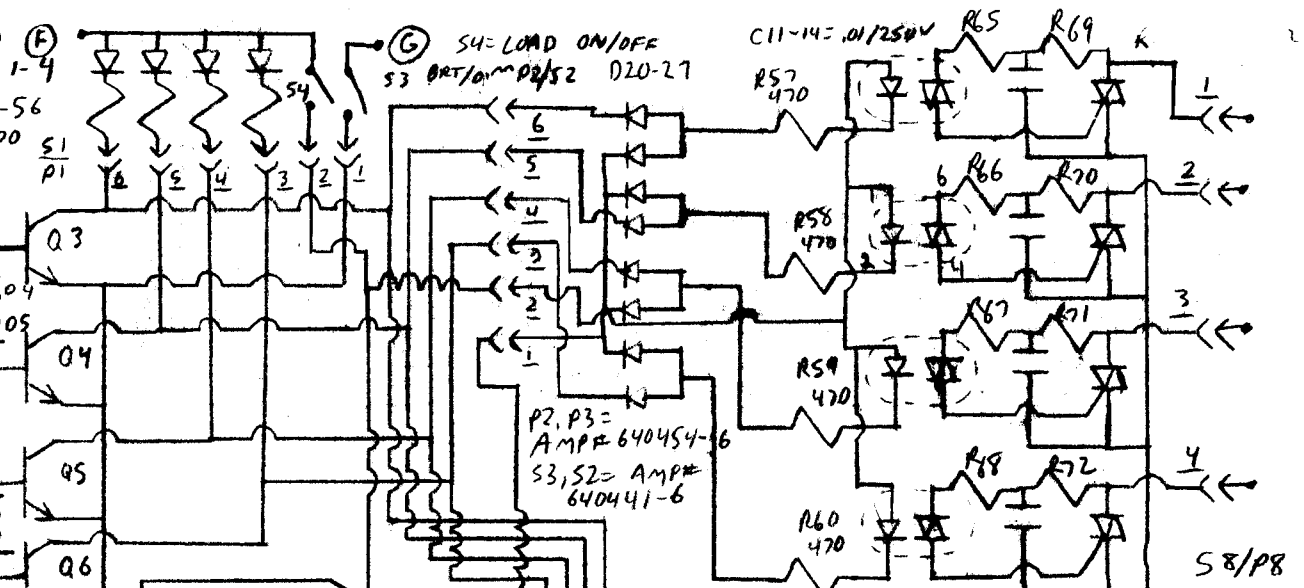
ST 27

SU 28

SV 29

SW 30

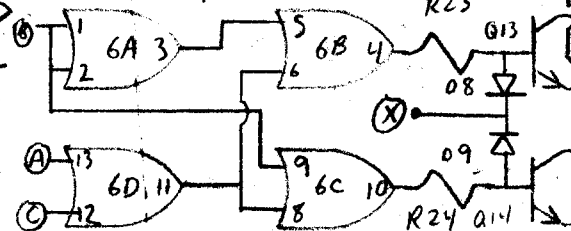
AMP# 64041-6
 = 640454-6
 AMP
 4030
 4070



Oct 13/1980
R9 LIGHTING CONTROLLER
 OMIT ON NON MATRIX
 IC6, Q12, 13, 14, S10, S6C,
 D20-35, R23, 24, 61-64,
 R73-80, C15-18, OPTO 5-8,
 TR 5-8
 IC6
 4001

OPTO 1-4 = MOC3010
 TR 1-8 = HUTTON IT-28 TR 14
 (MAY VARY OR EQUAL)
 R65-68 + 73-76
 820-1K2.5W
 R69-72 + 77-80
 180Ω, .5W
 D28-35
 R61
 470

S8/P8
 AMP
 CONNECTOR
 9 PIN-
 PINS ON
 CHASSIS
 6

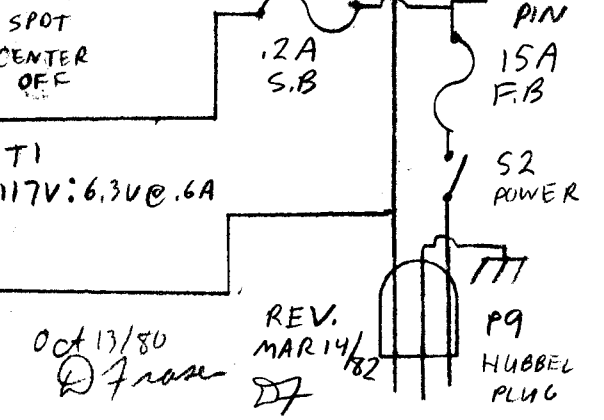
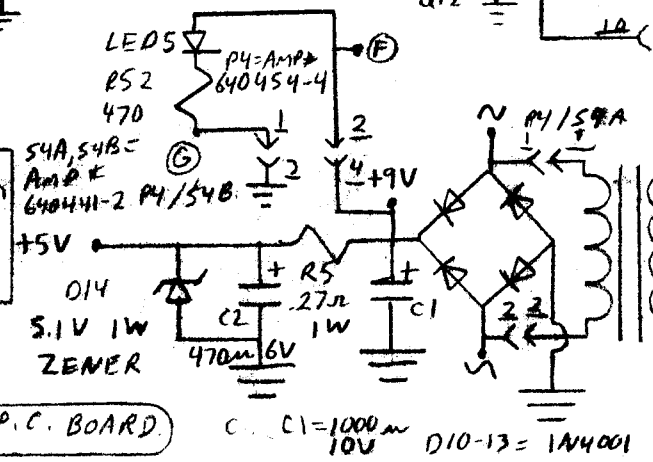


S8 = AMP# 1-480707-0
 P8 = AMP# 1-480706-0
 PINS = AMP# 350552-1
 SOCKETS = AMP# 350551-1
 GND. PIN = AMP# 350669-1

NOTE - THERE MAY
 BE A FUSE ON
 EACH TRIAC (SA)

VISIONS = INVERT
 S6 = REVERSE
 S7 = SHIMMER

OCT. 13/80 FROM
 FIRST DRAFT
 JUNE 30/80



SPOT
 CENTER
 OFF

.2A
 S.B

15A
 F.B

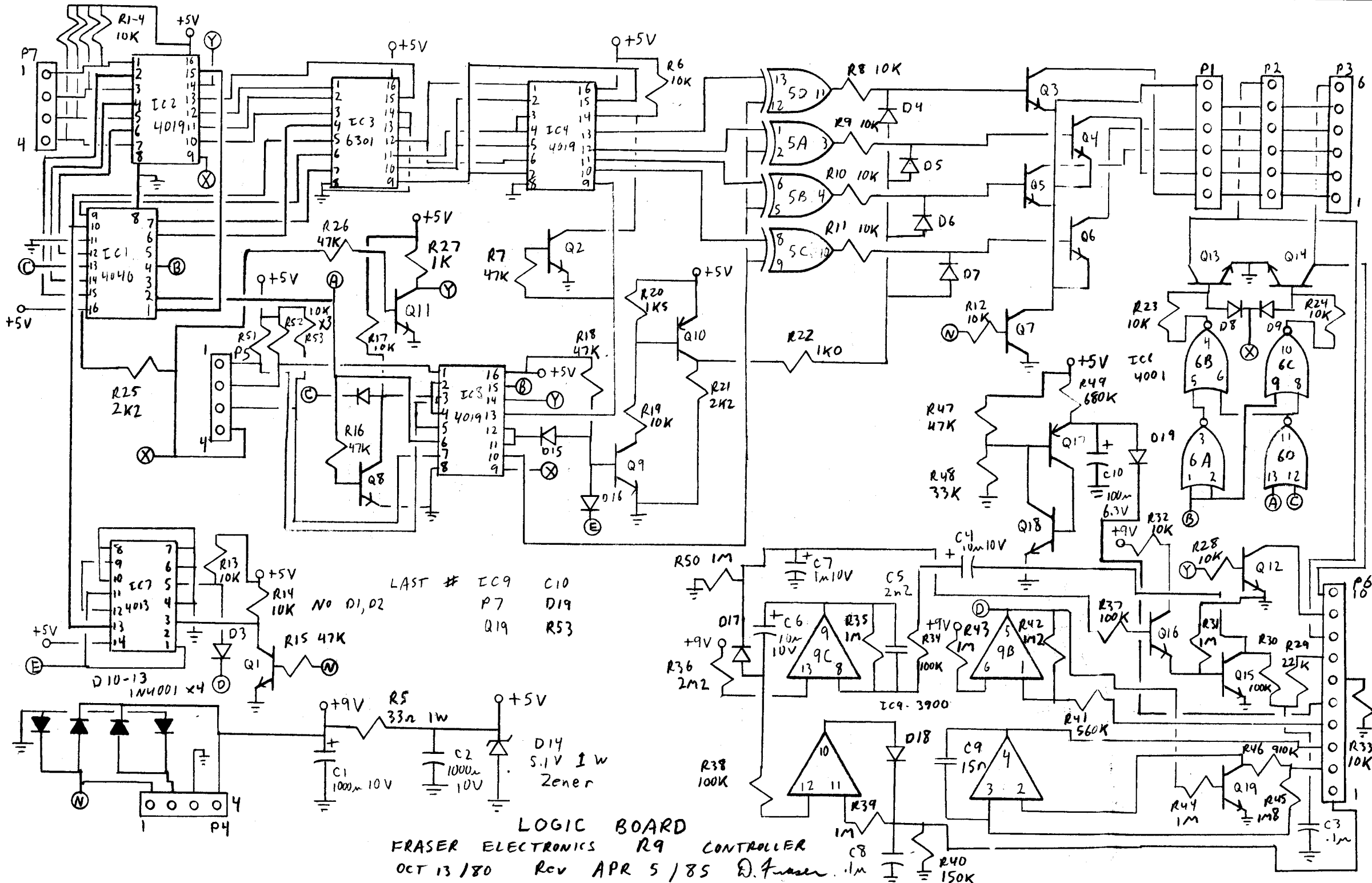
S2
 POWER

P9
 HUBBEL
 PLUG

4-0
 SOCKET ON P.C. BOARD.

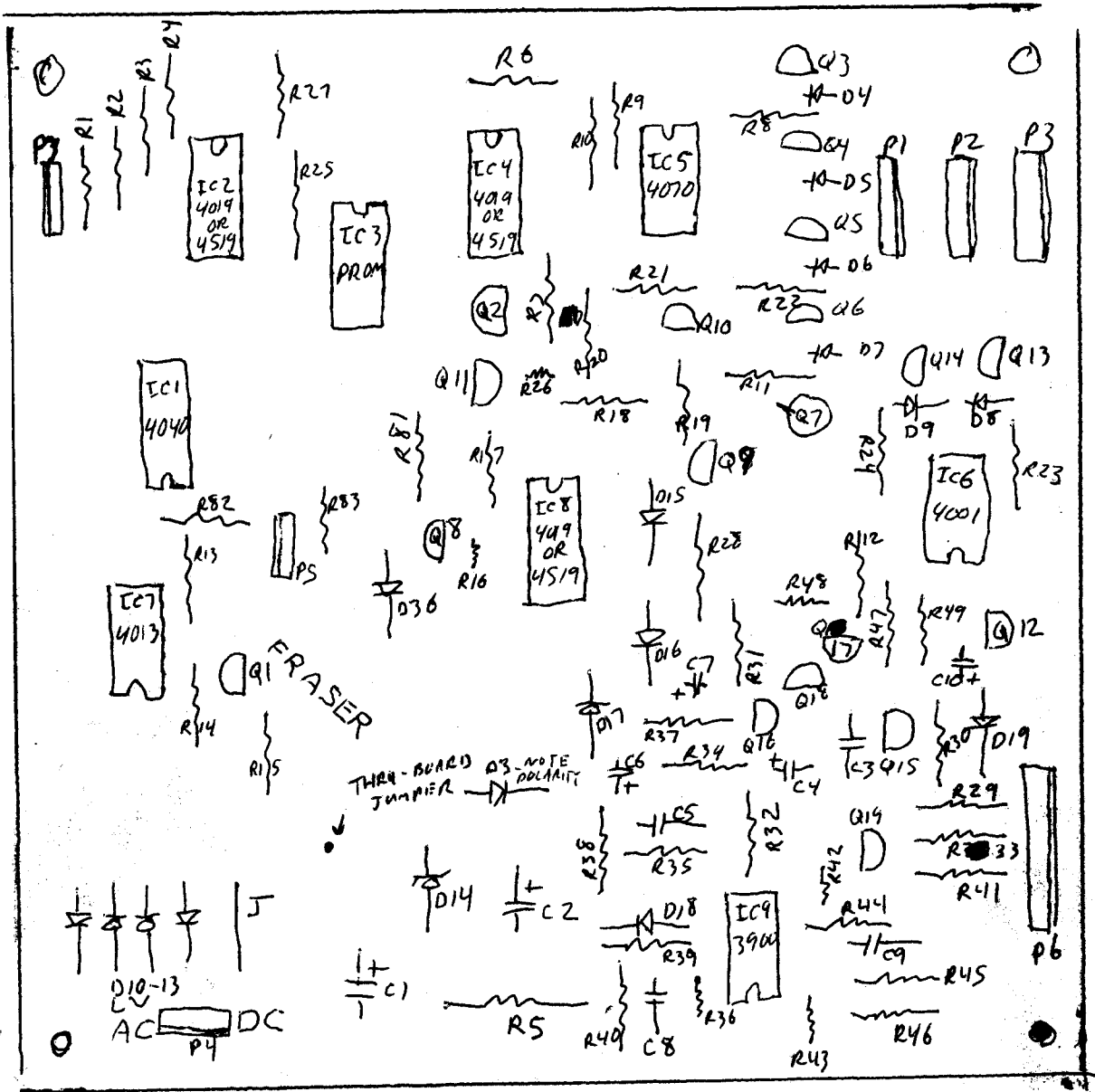
C1 = 1000µF
 10V D10-13 = 1N4001

Oct 13/80
 REV. MAR 14/82



LOGIC BOARD
 FRASER ELECTRONICS R9 CONTROLLER
 OCT 13 180 Rev APR 5 / 85 D. Fraser

R9 LOGIC BOARD PARTS LAYOUT



LED BOARDS

R53-56
R52
LED 1-5

PWR BDS.

R57-80
C11-18
D20-35

2/23/82

D. From

R9 Function Listing

- D1 No longer needed-replaced by a jumper.
- D2 Omitted
- D3 Level shifting diode. Converts 7V P-P signal at IC9 Pin 5 to 5V P-P signal for IC7 Pin 5.
- D4 to 7 These are the shimmer diodes, gating Q3-6 on when Q10 turns on.
- D8-9 These disable Q13 and 14 during manual mode with auto progression off.
- D10-13-These are the supply rectifiers.
- D14 Zener diode-supply reference.
- D15-16 These are an AND gate, and control Q9 in the shimmer function.
- D17 Peak detector for the AGC transistors.
- D18 Peak detector for the Audio circuit.
- D19 Level shifter for the ramp generator.
- D20-35 These are the matrix control gating diodes.
- D36 Control diode for the no shimmer without invert during auto progression interlock.
- R5 Dropping resistor for D14-Must be .5Watt metal film or 1 Watt carbon type.
- R20 Was 1.5K now 3.0K
- R38 Reduce if IC9D gain is too low.
- R39 Decrease if IC9D gain is too high.
- R49 Was 1M Now 560K
- R50 Jumper out during Auto Progression testing if desired
- R52-64 4700hm-0K to use 510 ohm.
- R65-68 & R73-76-Was 180 ohm .5Watt. Now 820 to 1K2 .5Watt.
- C2 May be reduced to 470mFd at 6Volts

R9 Function Listing.

- IC1. This chip is the main control counter for the unit. It runs the patterns and controls the pattern selector and modifiers during auto progression.
- IC2 This chip selects the pattern control source, either from the thumbwheel switch or from IC 1.
- IC3 This is the memory chip with the 16 patterns stored inside of it.
- IC4 This chip does the reverse direction function.
- IC5 This chip is the Invert function.
- IC6 Controls the matrix direction during Auto Progression.
- IC7A This is the zero crossing control, allowing the clock to advance only on zero crossings of the AC line.
- IC7B This is the first stage in the control chain, the rest of which is IC1
- IC8 This selects the modifier control source, between the manual switches and Auto Progression.
- IC9A This is the charge pump/ramp generator for the clock generator.
- IC9B This is a schmitt trigger for the clock circuit, both in Audio and Auto/Slide modes.
- IC9C This is the low pass audio filter and AGC.
- IC9D This is the peak detector for the audio circuit.
- Q1 This is the zero crossing detector for IC7A
- Q2' This is the control inverter for IC4.
- Q3,4,5 & 6 These are the LED/Opto drivers-The main logic board outputs.
- Q7 This controls the Bright/Dim function. In Dim mode, it removes the ground path for Q3 to 7 every half cycle of the AC line.
- Q8 This is the interlock that prevents shimmer from happening unless invert is also present during auto progression.
- Q9 & 10 These control the shimmer action.
- Q11 This is the inverter that controls ICs 2 & 8 to switch between manual and autoprogession modes.
- Q12 This enables the matrix switch when in the manual mode.
- Q13 and 14 These switch between the matrix modes during auto progression.
- Q15 & 16 These are the AGC device for audio triggering.
- Q17 & 18 These are simulating a programmable unijunction transistor in order to generate the ramp waveform in the slide mode.
- Q19 This reverses the charge pump, IC9A in order to generate the triangle wave required for the clock to operate.

1. Place a piece of carpet or a towell on the bench to avoid scratching the unit under test.

2. Place the controller in front of you, setting the controls as follows: Trigger Source to Auto, Matrix Switch to right side, Auto Progression Switch to off, Auto Rate control to middle, Bright/Dim Switch to bright, Load On/Off switch to off, Invert, Shimmer and Reverse Switches to off, Power Switch to off. The pattern selector thumbwheel may be in any position. Disconnect the jumpers from the logic board to the power boards.

3. Set Simpson 260 to R X 1 and polarity switch to +D.C.

4. Connect Black lead to a convenient ground point such as the anode of the zener diode.

5. Measure the resistance to ground at each end of the 27 or 33 ohm dropping resistor, R5. The reading should exceed 200 ohms at either end. If below this, investigate for solder bridges, etc.

6. Preset the isolated AC supply to 120Volts and set the current range to 3 Amps. Plug the R9 into the supply.

7. Connect the scope ground lead to a convenient ground point on the logic board, and connect the hot lead to the cathode of the zener diode. The scope should be set for 2V/Cm vertical. Sweep speed is not important.

8. Switch the R9 on. There should be a reading of 5.1Volts $\pm 10\%$ on the scope. If not, clear the power supply fault before proceeding.

9. The pilot lamp should be lit now. If not, the usual cause is that it has been wired backwards, or is not receiving power at all.

10. The indicators should be moving. If not check IC9 Pin 5. This is the 3900 and is the output of the clock generator. There should be a square wave here with ripple on the top. The duty cycle will probably not be 50%, but anything from a 30% to 70% duty cycle is OK. The amplitude will be about 7V P-P. Rotate the speed control to both ends to ensure that the speed does indeed vary end to end. If no square wave is present, the clock generator is faulty. If the square wave is present, check in this order until the fault is found: IC7 Pin 1 for 5V P-P square wave, IC7 Pin 3 for 60Hz square wave, IC1 Pins 10,9,7,6, IC3 Pins 9,10,11,12, IC 4 Pins 10,11,12,13, IC 5 Pins 3,4,10,11, and the Collectors of Q3,4,5,&6. 90% of the faults here are either solder bridges or improper parts placement.

11. With all 4 indicators now flashing, find the straight 1-2-3-4 pattern, which is usually "F" on the thumbwheel switch.

12. Check invert operation. IC5 controls this. The invert switch goes through IC 8 Pin 7 to pin 10 on to IC5 Pins 2,5,9 & 12.

13. Check reverse switch. This is done by IC4. The switch signal goes to IC8 Pin 1 to pin 13 and on to IC4 pins 9 & 11. Q2 acts as in inverter.

14. Check shimmer. On shimmer, all of the lights flash on for about 50% of a clock cycle on each clock cycle. This is produced by D4,5,6 &7. It is controlled through IC8 Pins 31 & 18 to Pins 11 & 12 on to D15, D16, Q9 and Q10.

15. Switch the invert on and set the trigger selector to audio.

16. Switch the Brt/Dim Switch to Dim. If the lights do not dim, check for a 60Hz square wave on the collector of Q7. This test need only be done if the Brt/Dim switch fails to work. There should be zero volts on the collector of Q7 when in the bright mode.

17. Set invert, shimmer and reverse switches to off and turn the trigger selector to slide. If slide action appears normal for one complete cycle, go to the next step. If not the scope should be connected to the emitter of Q17 to check for a slow positive going ramp waveform. This test must be done with a times 10 probe as the normal input impedance of the scope will upset the circuit and prevent it from functioning properly.

18. Return the trigger selector to Auto.

19. Go through the 16 positions on the thumbwheel switch and make sure no two are the same. If you get several patterns repeatin themselves through the 16 positions, the usyal cause is a solder bridge on IC2 pins 1,3,5,7, 10,11,12 or 13 Or on IC3 pins 1,2,3 Or 15 or on P3 pins 1,2,3 or 4.

20. Switch to auto progression. Place the probe from the scope to IC1 Pin 1 and note of it is high or low. Turn the rate control to max. and check to see that this pin eventually changes state. Jumpering R50 with a clip lead will speed up this process by 50%. When IC1 Pin 1 changes state, you will then know that all 16 patterns will be properly produced by IC3. While waiting for IC1 Pin1 to change state check that the invert, shimmer & reverse are functioning also. Note that while in the auto prograssion mode, shimmer should never come on at the same time that there is no invert. Inver must be on, for shimmer to come on. Q8 is present to act as an interlock to ensure this. Auto progression switching is done by IC's 2 & 8, with Q11 controlling the two ICs.

21. Connect a $\frac{1}{4}$ " to $\frac{1}{4}$ " cord from a speaker out test jack on the test panel to the audio input on the R9. Connect the wattmeter to the RCA jack above the $\frac{1}{4}$ " jack on the panel. Select an FM rock station and set the Bass control to the flat position.

22. Connect the scope to R41, a 560K resistor, where it connects to the 10 Pin amp connector Pin 4.

23. Turn rate control to maximum and note the waveform on the scope. Set the position control so that the 4V P-P (approx) line up as well as possible with graduations on the scope. These are the upper and lower trip points of the schmitt trigger IC9B and will help to determine if the audio trigger is working OK.

24. Switch the trigger selector to audio.

25. Turn up the audio until the indicators start to move. This should require less than .1 Watt.

26. Turn the balance control on the amp so that the sound almost disappears. This is to prevent step 27 from being too loud.

27. Turn up the level on the amp so that 50 Watts is shown on the meter, and check that there is good synchronization with the music.

28. If the case trigger needed over .1 Watt to work, IC9D has insufficient gain, and R38 should be shunted with another resistor until the trigger sensitivity is below .1 Watts.

29. If chase action is good at low level, but not at high level, refer to the waveform on the scope. If the pattern seldom approaches the upper trip point, IC9D has insufficient gain. See step 28 for the cure. If the waveform goes high OK, but seldom approaches the lower trip point, IC9D has too much gain and R39 will have to be shunted to reduce the gain. This assumes that the audio trigger circuitry has already been made functional.

30. Vary the input level from .1 to 50 Watts and make sure the R9 will trigger all through this range. If not, the AGC, IC9C may be at fault.

31. Turn down the amp to prevent blasting, and disconnect the audio cable.

32. Switch the trigger selector to Auto.

33. Switch off the AC supply or unplug the R9. If not done already, take an awl and slightly expand the pins in the rear panel connector.

34. Plug in the test display and reconnect the jumpers to the power boards.

35. Reconnect the AC power to the R9.

36. Check the pattern indicators for proper operation. Solder bridges on the power boards can sometimes cause two lights to come on at the same time that are not supposed to.

37. Put Brt/Dim Switch to Bright and switch the Load Switch to on.

38. Check for proper operation in all 3 matrix positions. If any channel is dead, the fault is usually either poor contact in the output connector, or a solder bridge from pins 1 and 2 on an opto coupler, while a lamp staying lit dimly when it is not supposed to, is either a leaky triac or

4.

a solder bridge from pin 5 to either pin 4 or 6 on an opto coupler.

39. Check Dim action with load.

40. Switch to auto progression and ensure that the R9 operates in all 3 matrix directions. If it will not, check in the vicinity of IC6.

41. Screw down the logic board.

42. Record the serial number, AEPB number, date completed and any modifications out of the ordinary in the record book.

43. Screw on the lid. If the unit is going out of town, a photocopy of the schematic should be tucked in under the logic board before putting the lid on.

44. Clean off the excess heatsink grease and fingerprints.

45. Make out the job invoice to the sales dept.

46. Deliver to sales dept, or pack as required.

Finis

The R9 lighting controller has two operating modes, MANUAL and AUTO PROGRESSION. In the manual mode, all functions are selected manually. In auto progression, the matrix, invert, shimmer, reverse and thumbwheel effect selector switches are taken over by the internal logic and will change patterns automatically. This mode is for when the operator is too busy to pay attention to the lights, yet does not want the lights do be doing the same thing all the time.

In practice, we have found that the operator will normally leave the unit in the auto progression mode and only select functions manually when they wish to use a specific pattern with a specific song.

THE CONTROLS:

Audio/Auto/Slide Rotary Selector Switch - This switch selects the source of the trigger pulses that actually sequence the lights. In the audio position, it uses the bass line in the music to trigger the lights. In the auto position, the speed of the lights is set by the RATE or SPEED control to the right. The slide position uses a "ramp" generator to control the speed. The speed of the chase starts very slow and gradually builds up until they are flashing at high speed. Then, once a certain speed is reached, the lights stop chasing and the sequence starts again. This function is useful when the controller is used during the day in a club environment where the operator wants the lights to do something yet there will be no music playing and a steady speed chase is too boring.

Matrix Switch - This switch is the sideways one to the right and slightly above the Audio/Auto/Slide switch. On many units this switch is unlabelled. In the manual mode, this switch controls the direction of the chase with a matrixed lamp display. In auto progression, this function is taken over by the internal logic.

Auto Progression Switch - When engaged, the matrix, pattern selector, invert, shimmer & reverse functions are taken over by the internal logic.

Rate or Speed Control - Sets the chase speed when the Auto mode is selected by the Audio/Auto/Slide Selector Switch.

Bright/Dim Switch - This switch dims the lamps 50%. Please note that this switch applies DC to the lamps and if used with transformer operated lamps or neon, it must be jumpered out to defeat its function. Failure to do this will result in destruction of the transformers in the lights. With regular incandescent lamps, this function is perfectly safe and no problems will result.

Pattern Selector Switch - This is the unlabelled thumbwheel switch in the middle. It has 16 positions, to select the 16 basic patterns. This switch has its function taken over by the internal logic when the auto progression mode is selected.

Load On/Off Switch - This switch turns the lamps on or off, while still allowing the controller to operate. This may be used by the operator to select the pattern he wants with the lamps off and then switch the lamps on only when appropriate. This switch could also be called a "preview" switch.

Invert Switch - This switch inverts the pattern. That is, for example, instead of one light on, with 3 dark, you can get one off with three on. Some people call this a "Light Chase/Dark Chase" switch.

Shimmer Switch - This switch flashes all the lights on during the first half of each chase step. It looks best if used with the invert function. In the auto progression mode, this function only comes on if

the pattern is inverted.

Reverse Switch - This reverses the direction of the chase pattern. As stated earlier, the invert, shimmer and reverse functions are controlled by the internal logic during the auto progression mode. For these switches to have any effect on the lamps, the controller must be in the manual mode.

Power Switch - This switch controls the main AC power to the unit. Please note that when the AC power is turned off, the logic for the auto progression is reset, starting the auto progression program over once the power is switched back on.

Rear Panel

AC Cord - Do NOT defeat the third prong on the AC cord. It is there for your safety. If the cord is damaged in any way, it must be replaced by a qualified technician.

Fuse Holder - Replace the fuse only with the type indicated on the rear panel.

Audio Input Jack - This is the 1/4" mono phone jack. Please note that the ground side of the jack is completely isolated from the chassis. The input impedance is 22K ohms and the input signal may be anything from .5 Volts to 50 Volts RMS. This means that you could use an amplifier up to 1000 Watts without any worry about damaging the audio input circuit. The audio input has automatic gain control for operator ease.

Output Connector - This is usually a 10 pin Cinch Jones socket. The male connector to use with it is Cinch Jones part # P310CCT. It is available through most electronics part suppliers. The pins 1,3,5 & 7 are the "X" Axis outputs in a matrixed display, while the pins 2,4,6 & 8 are the "Y" Axis outputs. Pins 9 & 10 are ground pins, wired to the case of the unit and to the third wire ground of the AC cord. This pin out is slightly different in 24 Volt units used for low voltage loads. Please consult the wiring diagram enclosed with those units.

Spare Parts

Spare parts may be ordered from:

FRASER ELECTRONICS

P.O.Box 4265

Vancouver, B.C. V6B 3Z7

or from the dealer where you purchased the unit. Thank you for purchasing the R9 Programmed Lighting Controller. If you have any questions about it or any other lighting control application you may have please feel free to send us a letter of to consult with your dealer.

A Note for the Professional Technician Installing this unit.

When installing these units care should be taken to allow unrestricted air flow around the cabinet if the loading exceeds 2500Watts total. If it is installed in an enclosed cabinet, a fan should be provided to allow sufficient cooling.

When inserting the AMP pins into the connector they should be inserted as far as they can go until they click into place. After the socket pins are in place, the pin should be flared slightly with the prong on a pair of needle nose pliers or with a small punch. If this is not done the connector will be extremely difficult to fit into place. Also, If more than 5 Amps will be flowing through any pin, the connection should be soldered as well as crimped or the connector will run warm.

Note that any short circuit in the load will instantly blow a triac if power is connected and shorted triacs are not covered under the warranty except when the lights are also purchased and installed by the dealer selling the controller.


While the power switch is a UL and CSA approved 20Amp per side type, its life can be extended indefinitely if the lamps are switched off by the "LIGHTS ON" switch before the power is switched off. Conversely, when switching on, switch life will be improved if the lamp load is turned off with the lights on switch before switching on. After the power switch is turned on and the controller is running, the load can be engaged with the lights on switch. The lights on switch operates at logic level and may be used as often as necessary with no detriment to anything.

The Bright/Dim switch comes jumpered out on all US models, and this jumper must be removed if you want the dim function to work. The reason that this is done, is because if the dim is engaged with transformer operated loads such as "RAIN LIGHTS" or NEON, the transformers in them will be destroyed and the controller may be damaged. The reason for this is that on dim, DC is applied to the load which cannot be used by transformers. The jumper prevents accidental damage from the use of this switch. If ordinary incandescent lamps are used, however, it is perfectly safe to use the dim function as long as none of the lamps are transformer operated.

To ease in service, the schematic diagram is tucked in under the main printed circuit board.

The input connections for the power are industry standard color code. The BLACK and RED are the HOT lines and should be 110Volts above the Neutral which is WHITE. The voltage between the Red and Black may be 180' out of phase giving a reading of as high as 240V. The GREEN of course is your chassis ground. Under no circumstances should the unit be connected to two legs of a three phase system. If this is done, it will still function, but the zero crossing timing will be at the wrong time for two channels, and there will be a large amount of electrical noise induced into the sound system. If the input power is three phase, both the red and black must be on the same leg.

If there are any further question, I may be contacted through the dealer where this unit was purchased.



Daniel Fraser

Aug. 18/1980

Memory Interchangeability

	745387 1.79	745287 1.79	545387	545287
AMD.	27510C PC	27511C PC	27510M PC	27511M PC.
FSC	93416C PC 93417PC - 1.95.	93426M - PC 93427PC. 1.95.	93417M - PC	93426M - PC. (7).
HARRIS	HM17610-5	HM17611-5	HM17610-2.	HM17611-2
HARRIS	HPROM1024A-5	HPROM1024-5.	HPROM1024A-2.	HPROM1024-2
INTEL.	P3601		Q3601	
INTERSIL. CPE SUPPLY	IM5603AC	IM5623C	IM5603AM.	IM5623M
MMI PREPA H63	S 6201N	H6201N	S201 N	H15201 N
MMI	6300 N (6300J-1) 1.95	6301 N (6301J-1) 1.95	S300 N	S301 N
NSE.	DM8573N	DM8574N	DM7573 N	DM7574 N
SIG	N825126 B	N825129 B	S825126B	S825129B
SIG		N825229B.		S825229B.

PRUM selection Guide

RAE
451 6001

WORD NO.	OUTPUTS				REMARKS
	04	03	02	01	
0	0	1	1	1	7
1	1	0	1	1	8
2	1	1	0	1	P
3	1	1	1	0	E
4	0	1	1	1	7
5	1	0	1	1	R
6	1	1	0	1	A
7	1	1	1	0	E
8	0	1	1	1	7
9	1	0	1	1	B
10	1	1	0	1	0
11	1	1	1	0	E
12	0	1	1	1	7
13	1	0	1	1	R
14	1	1	0	1	0
15	1	1	1	0	E
16	0	0	1	1	3
17	1	0	0	1	9
18	1	1	0	0	C
19	0	1	1	0	3
20	0	0	1	1	3
21	1	0	0	1	9
22	1	1	0	0	C
23	0	1	1	0	3
24	0	0	1	1	3
25	1	0	0	1	9
26	1	1	0	0	C
27	0	1	1	0	3
28	0	0	1	1	3
29	1	0	0	1	9
30	1	1	0	0	C
31	0	1	1	0	6
32	0	0	1	1	3
33	0	1	1	0	6
34	1	0	0	1	9
35	1	1	0	0	C
36	1	1	1	0	E
37	0	0	1	0	2
38	0	1	0	1	S
39	1	0	0	0	8
40	1	1	0	1	B
41	1	1	1	0	E
42	0	0	0	1	1
43	0	1	0	0	4
44	0	1	1	1	7
45	1	0	1	0	A
46	1	1	0	1	0
47	0	0	0	1	1
48	0	1	1	1	7
49	1	0	1	1	B
50	1	1	0	1	E
51	1	1	1	0	E
52	1	1	1	0	E
53	1	1	0	1	0
54	1	0	1	1	B
55	0	1	1	1	7
56	0	1	1	1	7
57	1	0	1	1	B
58	1	1	0	1	0
59	1	1	1	0	E
60	1	1	1	0	E
61	1	0	0	1	0
62	1	0	1	1	0

THERE ARE NO "0" OR "F" ENTRIES

R9 PROM PROGRAM

WORD NO.	OUTPUTS				REMARKS
	04	03	02	01	
64	0	0	1	1	3
65	0	0	1	1	3
66	1	1	0	0	C
67	1	1	0	0	C
68	0	0	1	1	3
69	0	0	1	1	3
70	1	1	0	0	C
71	1	1	0	0	C
72	0	0	1	1	3
73	1	1	0	0	C
74	0	0	1	1	3
75	1	1	0	0	C
76	0	0	1	1	3
77	1	1	0	0	C
78	0	0	1	1	3
79	1	1	0	0	C
80	0	1	1	1	7
81	1	0	1	1	A
82	0	1	1	1	7
83	1	0	1	1	A
84	1	1	0	1	0
85	1	0	1	1	B
86	0	1	1	1	7
87	1	0	1	1	B
88	1	1	0	1	0
89	1	1	1	0	E
90	1	1	0	1	0
91	1	1	1	1	B
92	0	1	1	1	7
93	1	0	1	1	B
94	1	1	0	1	0
95	1	0	1	1	B
96	0	0	1	1	3
97	1	0	0	1	9
98	1	1	0	0	C
99	0	1	1	0	5
100	0	0	1	1	3
101	1	0	0	1	9
102	1	1	0	0	C
103	0	1	1	0	6
104	0	0	1	1	3
105	1	0	0	1	9
106	1	1	0	0	C
107	0	1	1	0	0
108	0	1	1	0	0
109	1	1	0	0	C
110	1	0	0	1	9
111	0	0	1	1	3
112	0	1	1	1	7
113	1	0	1	1	B
114	1	1	0	1	B
115	1	1	1	0	E
116	0	1	1	1	7
117	1	0	1	1	B
118	1	1	0	1	0
119	1	1	1	0	E
120	0	1	1	1	7
121	0	1	1	1	B
122	1	1	0	1	A D
123	1	1	1	0	E
124	1	1	0	1	0
125	1	0	0	1	B
126	1	1	1	0	3

WORD NO.	OUTPUTS				REMARKS
	04	03	02	01	
128	0	0	1	1	3
129	1	0	0	1	9
130	1	1	0	0	C
131	0	1	1	0	6
132	0	1	1	0	0
133	1	1	0	0	C
134	1	1	0	1	9
135	0	0	1	1	3
136	0	0	1	1	3
137	1	0	0	1	9
138	1	1	0	0	C
139	0	1	1	0	E
140	0	1	1	0	6
141	1	1	0	0	C
142	1	0	0	1	9
143	0	0	1	1	3
144	0	1	1	1	7
145	1	0	1	1	B
146	1	1	0	1	0
147	1	1	1	0	E
148	0	1	1	1	7
149	1	0	1	1	B
150	1	1	0	1	0
151	1	1	1	0	E
152	1	1	1	0	E
153	1	1	0	1	0
154	1	0	1	1	B
155	0	1	1	1	7
156	1	1	1	0	E
157	1	1	0	1	0 D
158	1	0	1	1	B
159	0	1	1	1	7
160	0	1	0	1	S
161	1	0	1	0	A
162	0	1	0	1	S
163	1	0	1	0	A
164	0	1	0	1	S
165	1	0	1	0	A
166	0	1	0	1	S
167	1	0	1	0	A
168	0	1	0	1	S
169	0	1	0	1	S
170	1	0	1	0	A
171	1	0	1	0	A
172	0	1	0	1	S
173	0	1	0	1	S
174	1	0	1	0	A
175	1	0	1	0	A
176	0	1	1	1	7
177	1	0	1	1	B
178	1	1	1	0	D
179	1	1	1	0	E
180	1	1	0	1	0
181	1	0	1	1	B
182	0	0	1	1	7
183	0	0	1	1	B
184	1	1	1	0	0
185	1	1	1	0	1
186	1	1	0	1	0
187	1	0	1	1	B
188	0	1	1	1	7
189	0	1	1	1	B
190	1	1	0	1	0

WORD NO.	OUTPUTS				REMARKS
	04	03	02	01	
192	1	0	1	1	B
193	1	1	0	1	0
194	1	0	1	1	B
195	1	1	0	1	0
196	1	0	1	1	B
197	0	1	1	1	7
198	1	0	1	1	B
199	1	1	0	1	0
200	1	1	1	0	E
201	1	1	1	0	0
202	1	0	1	1	0
203	0	1	1	1	7
204	1	0	1	1	7
205	1	1	0	1	0
206	1	1	1	0	E
207	1	1	0	1	B
208	0	1	1	1	7
209	1	0	1	1	B
210	1	1	0	1	0
211	1	1	1	0	E
212	0	1	1	1	7
213	1	0	1	1	B
214	1	1	0	1	0
215	1	1	1	0	E
216	0	1	1	1	7
217	1	0	1	1	B
218	1	1	0	1	0
219	1	1	1	0	E
220	0	1	1	1	7
221	1	0	1	1	3
222	1	1	0	1	0
223	1	0	1	1	B
224	0	1	1	1	7
225	1	0	1	1	B
226	1	1	0	1	0
227	1	1	0	1	0
228	1	1	1	0	E
229	0	1	1	1	7
230	1	0	1	1	B
231	1	0	1	1	B
232	1	1	0	1	0
233	1	1	1	0	E
234	0	1	1	1	7
235	0	1	1	1	7
236	1	0	1	1	B
237	1	1	0	1	0
238	1	1	1	0	E
239	1	1	1	0	E
240	0	0	1	1	3
241	1	0	0	1	9
242	1	1	0	0	C
243	0	1	1	0	6
244	1	1	0	0	C
245	1	0	0	1	7
246	0	0	1	1	3
247	1	0	0	1	0
248	0	1	0	0	C
249	0	1	1	0	6
250	1	0	0	0	C
251	1	0	0	1	7
252	1	0	0	1	7
253	1	0	0	1	7
254	0	1	1	0	0

BINARY
THUMB WHEEL
S9

INVERT
S5

SHIMMER
S7

REVERSE
S6

AUTO PROG
S8

BRT/DIM
S4

LOAD
S3

MATRIX

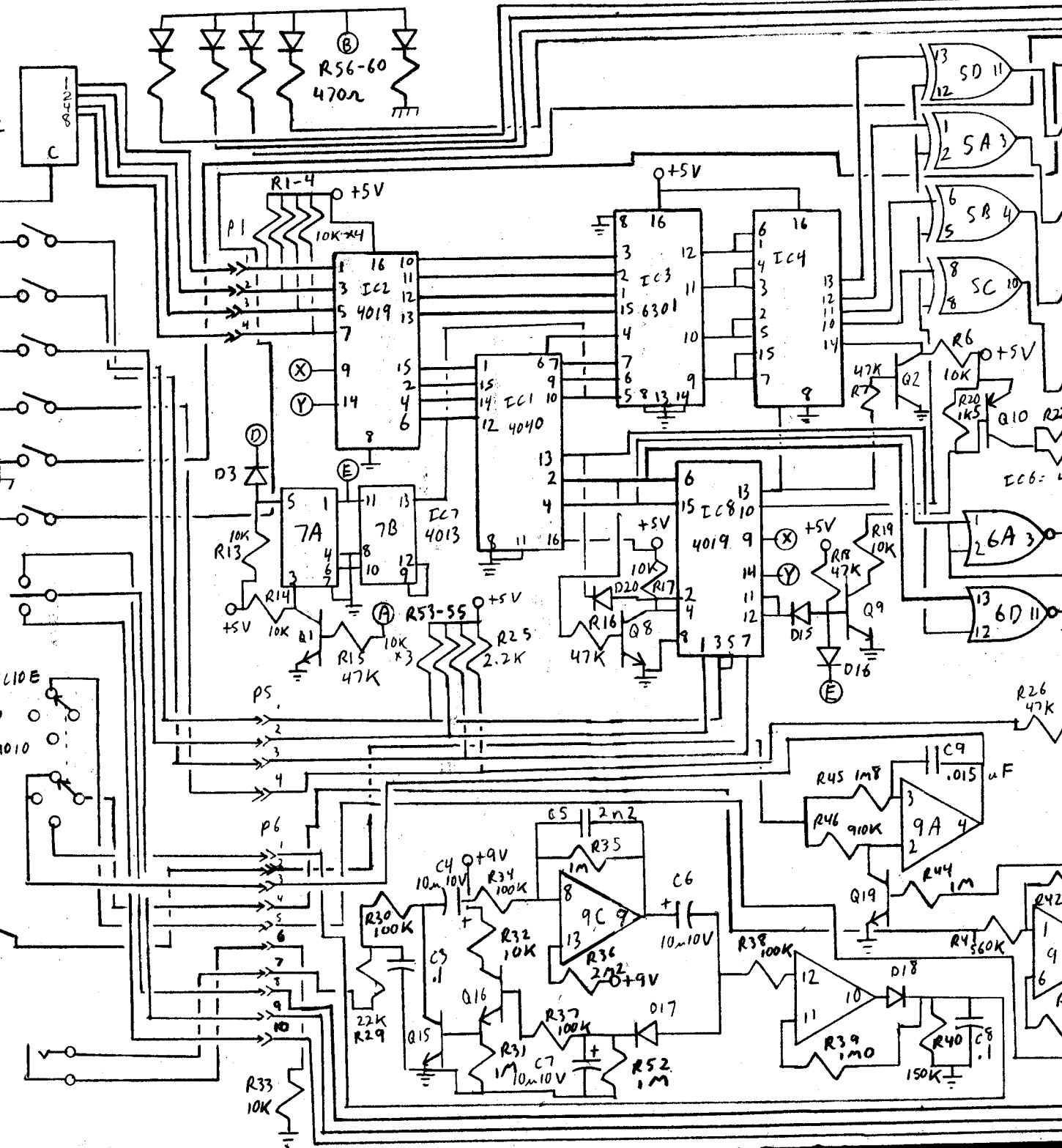
SLIDE
S1
AUTO
A4010

R50
100K

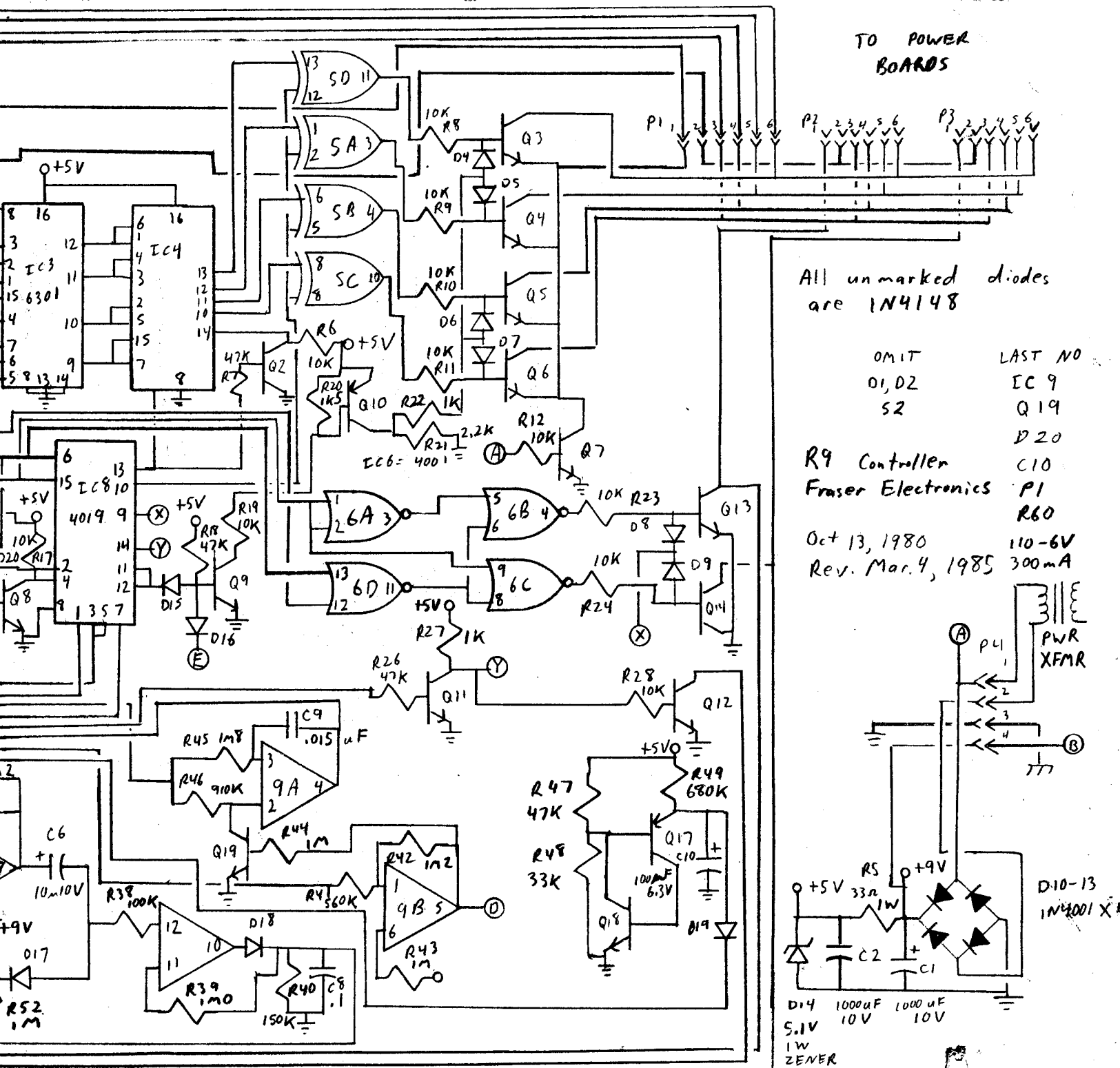
P1
100K

R51
22K

R33
10K



TO POWER
BOARDS

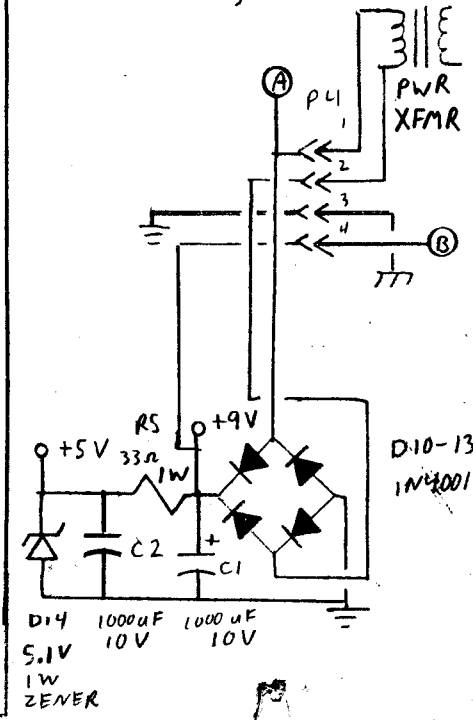


All unmarked diodes
are 1N4148

- | | |
|--------|---------|
| 0M1T | LAST NO |
| 01, 02 | IC 9 |
| S2 | Q19 |
| | D20 |

R9 Controller
Fraser Electronics
P1
R60

Oct 13, 1980
Rev. Mar. 4, 1985
110-6V
300mA



D10-13
1N4001 X 4
D14 1000uF 10V
5.1V
1W
ZENER



AUTO
AUDIO SLIDE



TRIGGER
SOURCE



ON
OFF

AUTO PROGRESSION



AUTO
RATE



ENT



OFF



LOAD

ON



OFF



INVERT



SHIMMER



REVERSE



POWER

R 9

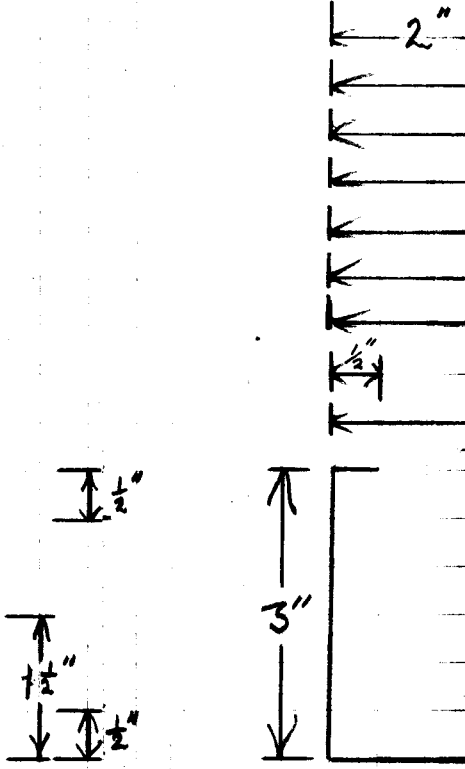
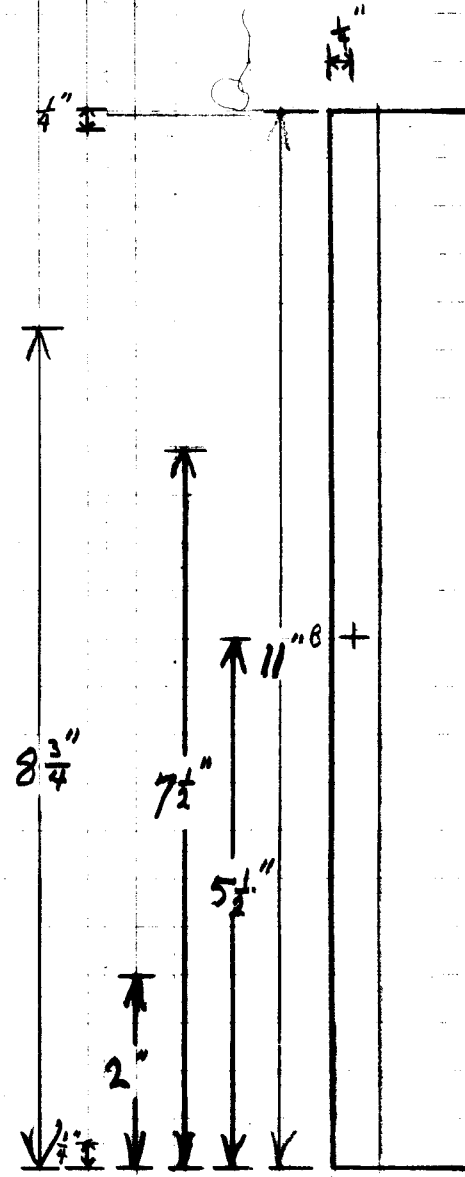
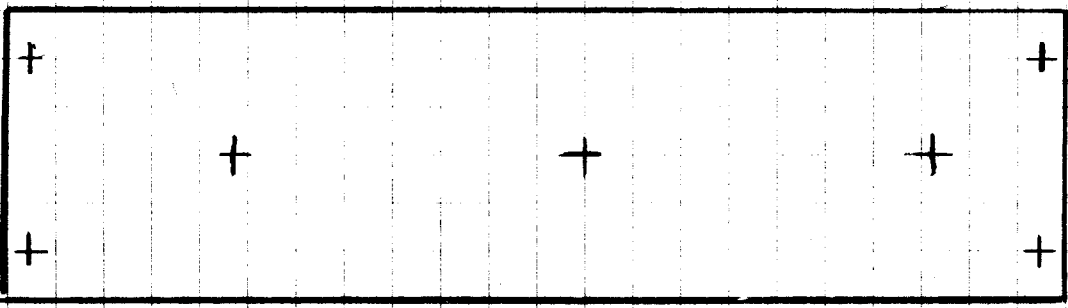
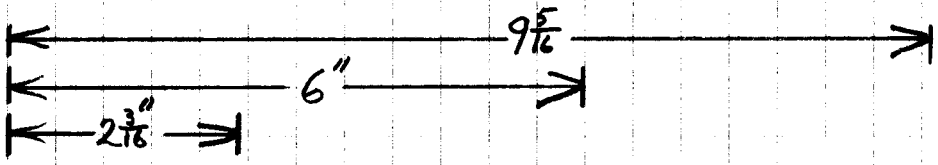
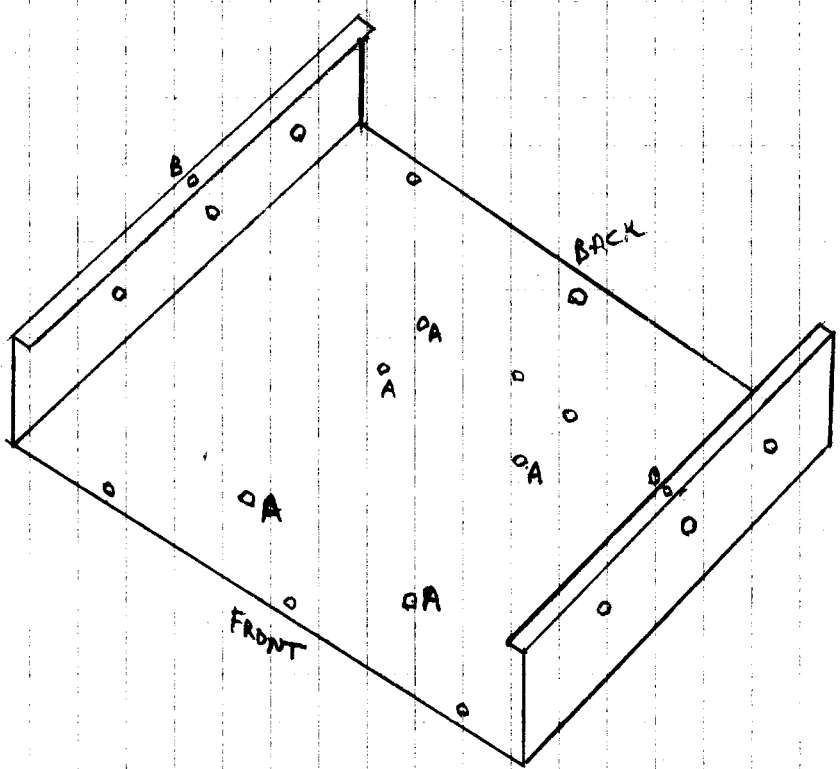
PROGRAMMED

LIGHTING

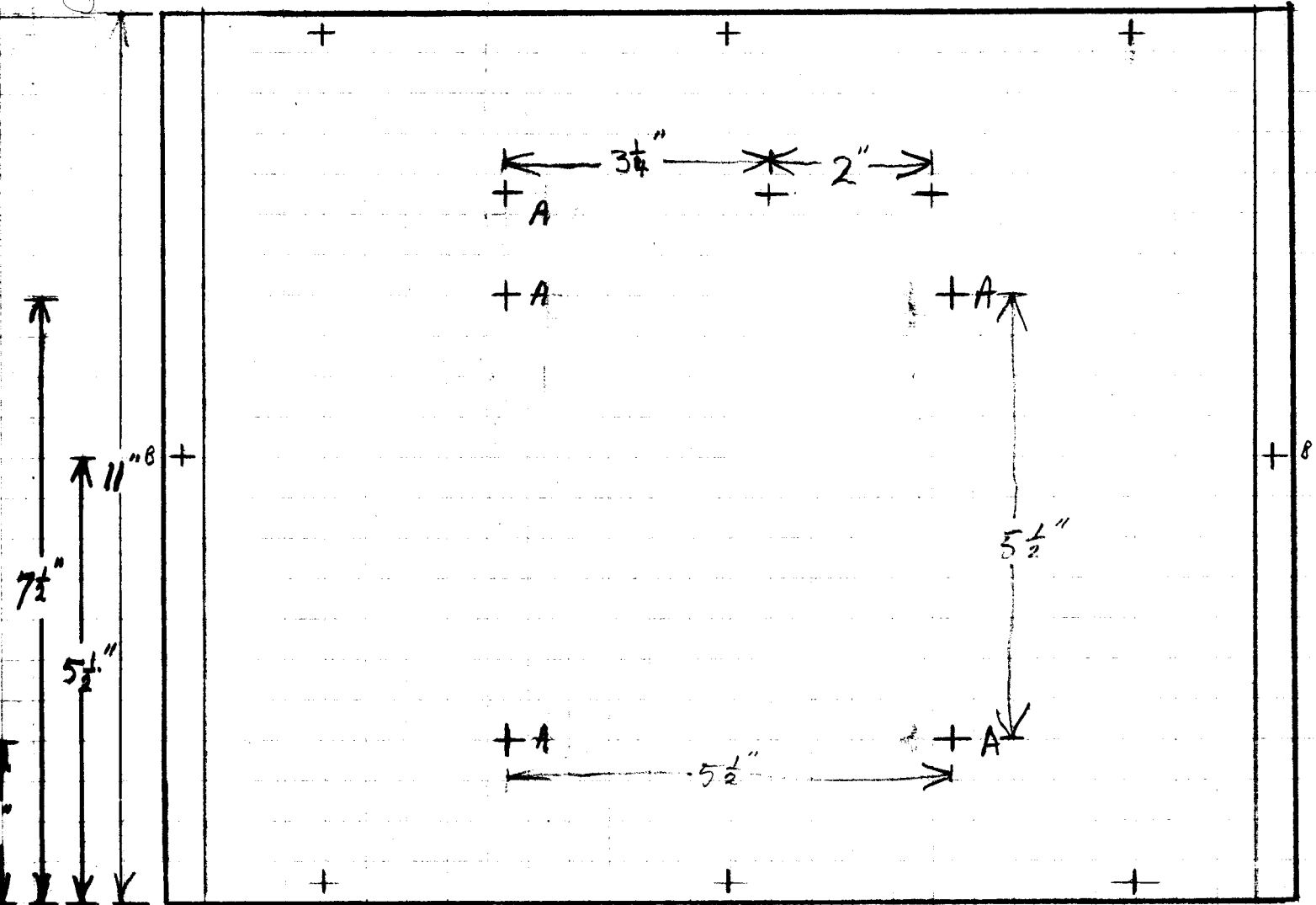
CONTROLLER

ALL MEASUREMENTS INCLUDE THICKNESS OF METAL
 HOLES MARKED "A" @ $\frac{9}{64}$ " DIA (5 TOTAL)
 HOLES MARKED "B" @ $\frac{3}{32}$ " DIA (2 TOT.)
 ALL OTHER HOLES @ $\frac{3}{16}$ " DIA (22 TOT.)
 29 HOLES TOTAL

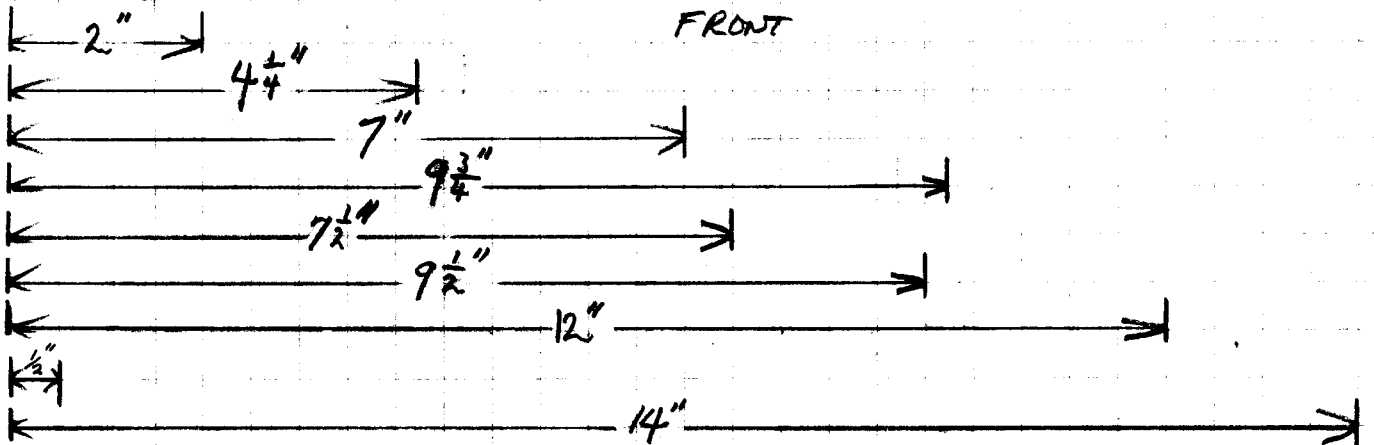
SCALE : 1 INCH = 2 DIVISIONS



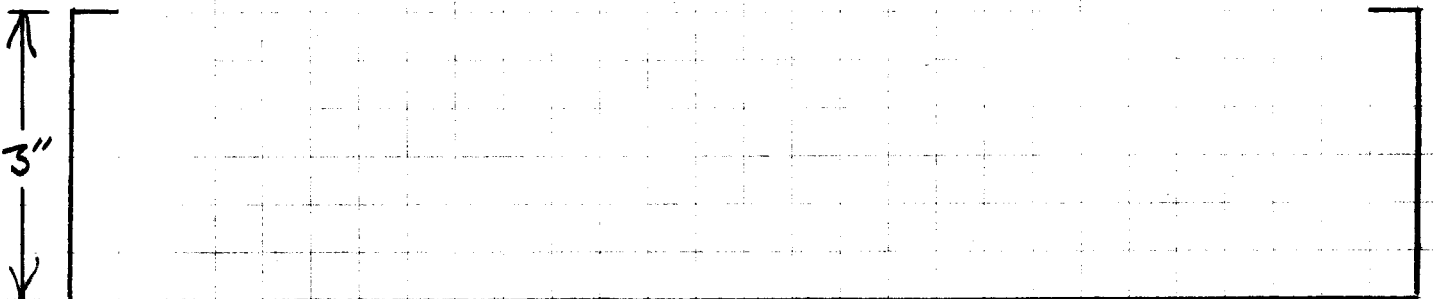
BACK



FRONT

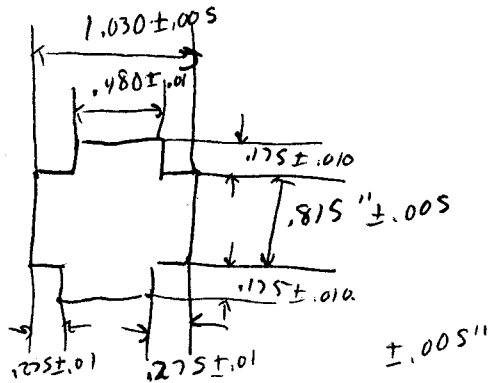


3"



Rear

1 of



- 1 - 1/2" Round or standard base punch
- 1 - .875 K.O. punch
- 1 - 17mm CLIFF JACK
- 1 - 9/64 GND CH6.

BOTTOM = 4x PCB = 4x 9/64
 2-TWR 2x 3/16

SIDES ea 3x 3/16.

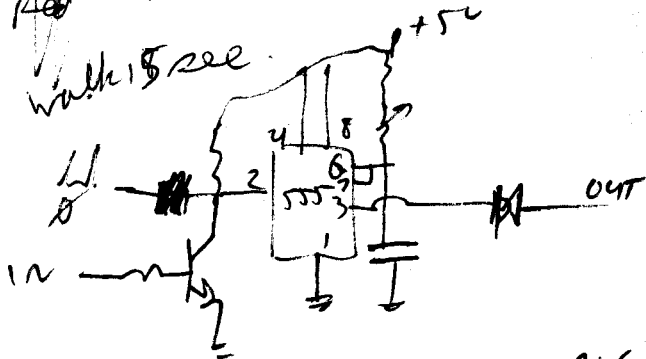
FRONT PANEL 1x PCB 5x 5.1mm 2x 9.5mm 6 = 1/4 + 3/4
 1 - T.W. SW.

SUB PANEL 1x PCB 5x 9.5mm 2x 9.5mm 6 = 1/4 + 3/4 or SLIGHTLY LARGER
 15x 9/64
 1-TW SW (13/8" φ)

Rear Panel Hole for Amp connector

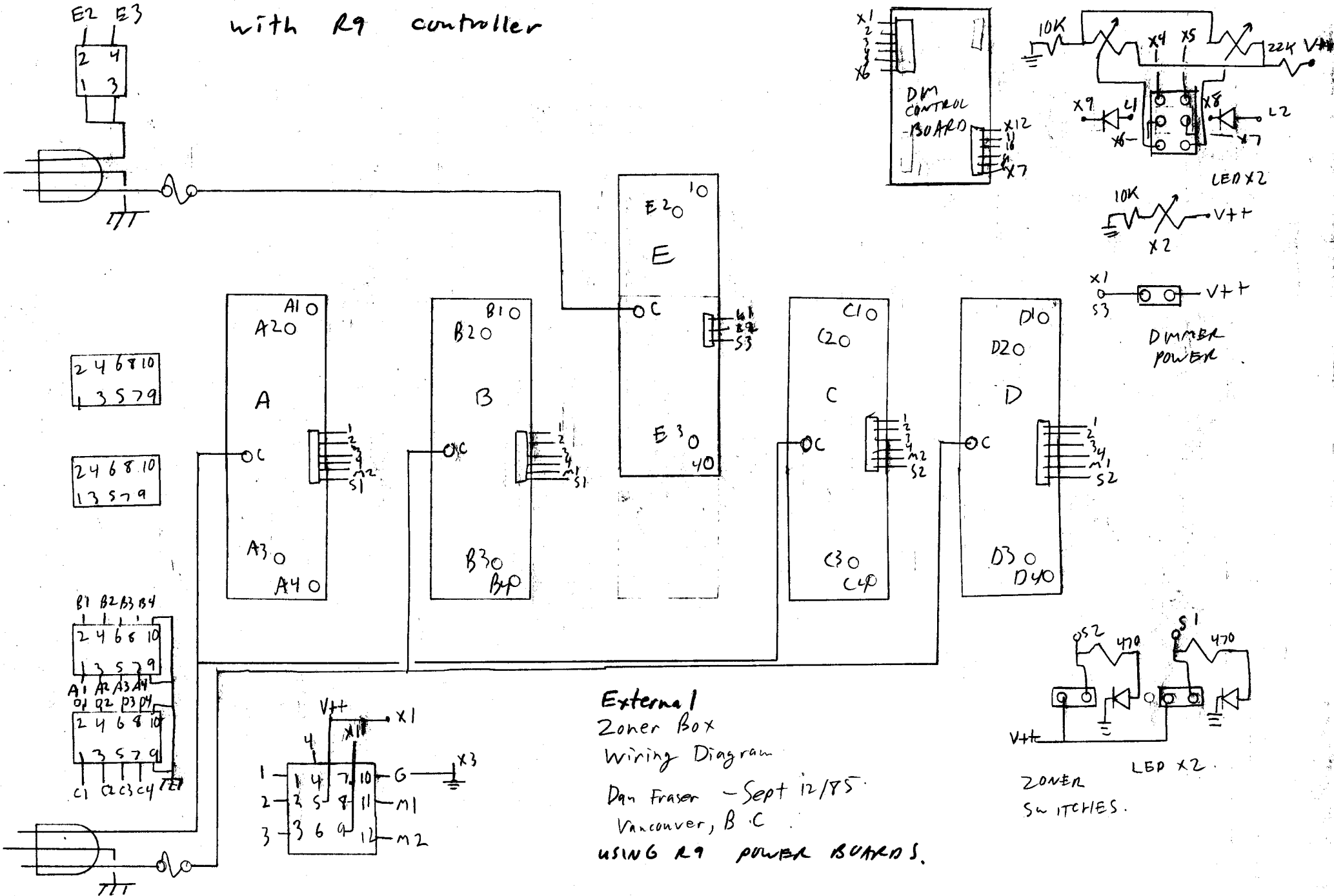
Pre Heat
circuit for
lamps.

~~1000~~ - 3 sec
~~1000~~ - 31 sec
wait 15 sec.



USED WHEN CHASING BIG
LAMPS WITH THERMAL LAG.

External Zone Box for use with R9 controller



External Zoner Box Wiring Diagram

Dan Fraser - Sept 12/85
 Vancouver, B.C.
 USING R9 POWER BOARDS.