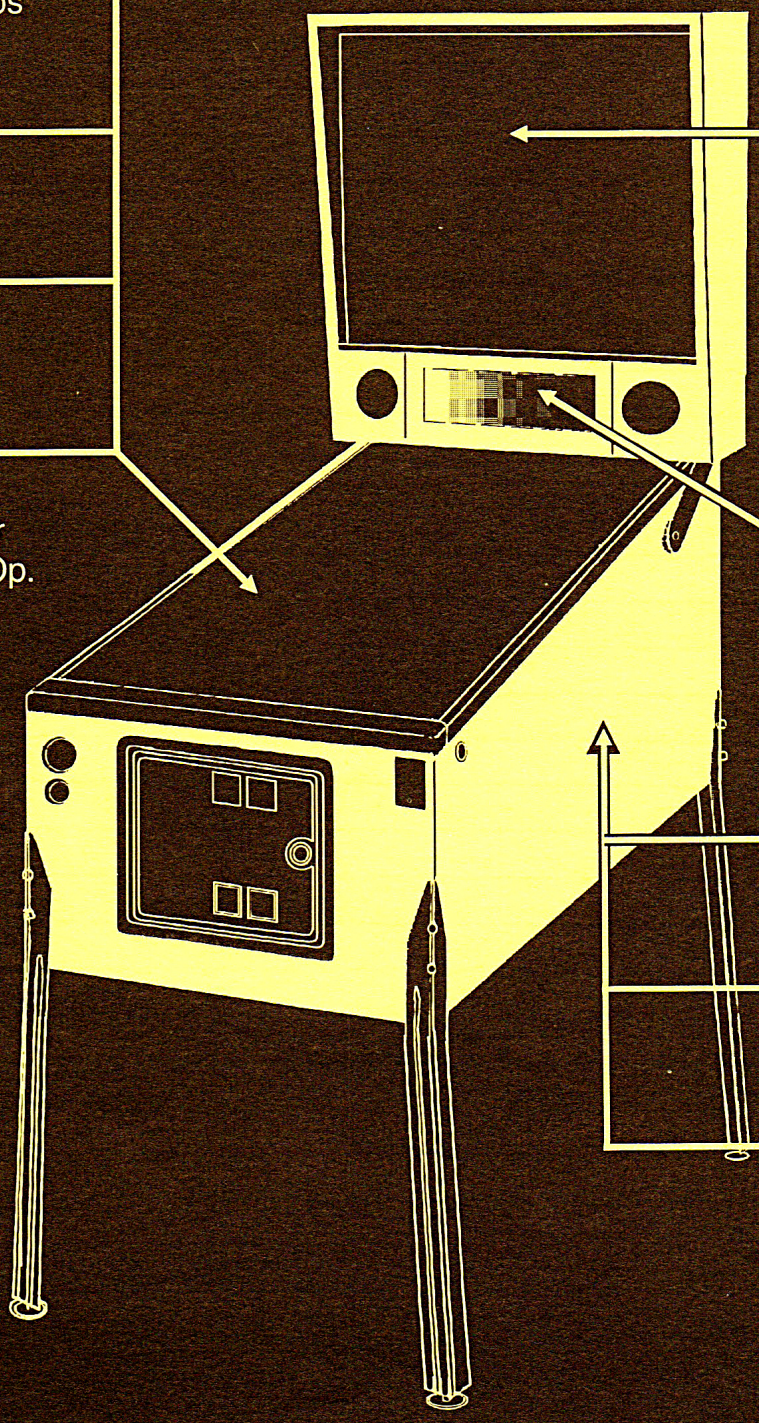
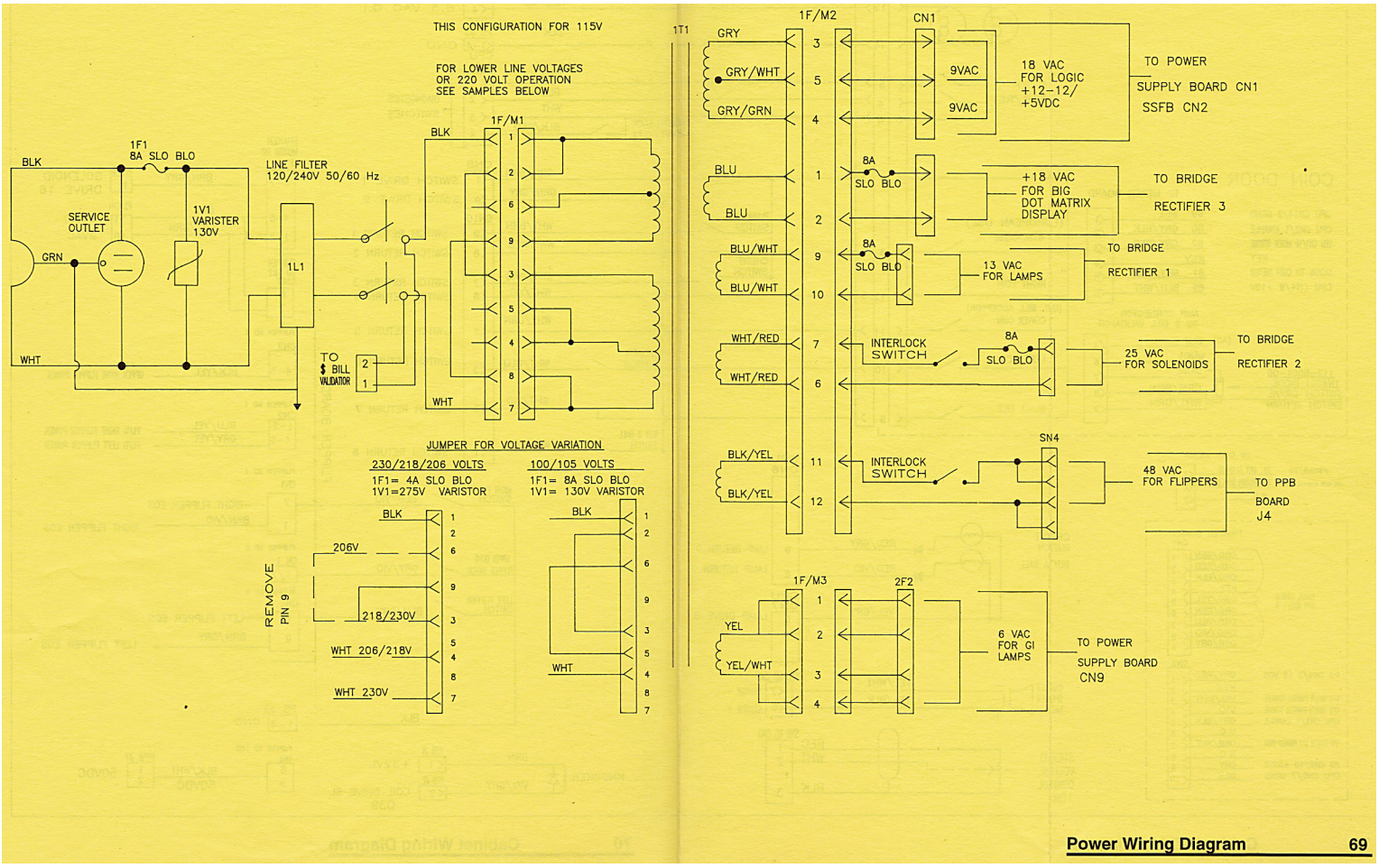
SCHEMATICS / TROUBLESHOOTING (YELLOW SECTION)
Page Guide



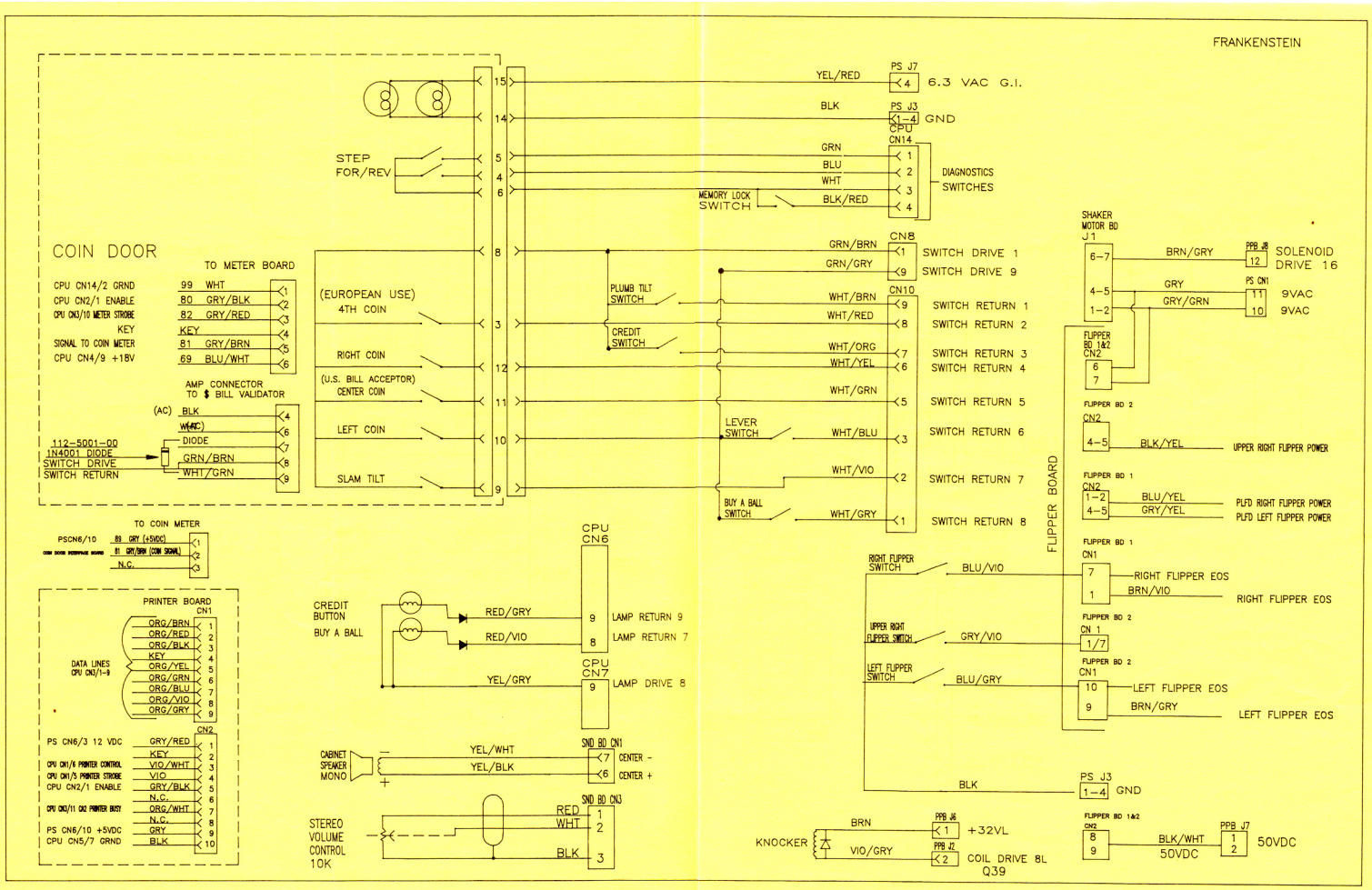
MSF071.psd

Schematics / Troubleshooting Notes

MSF072.psd

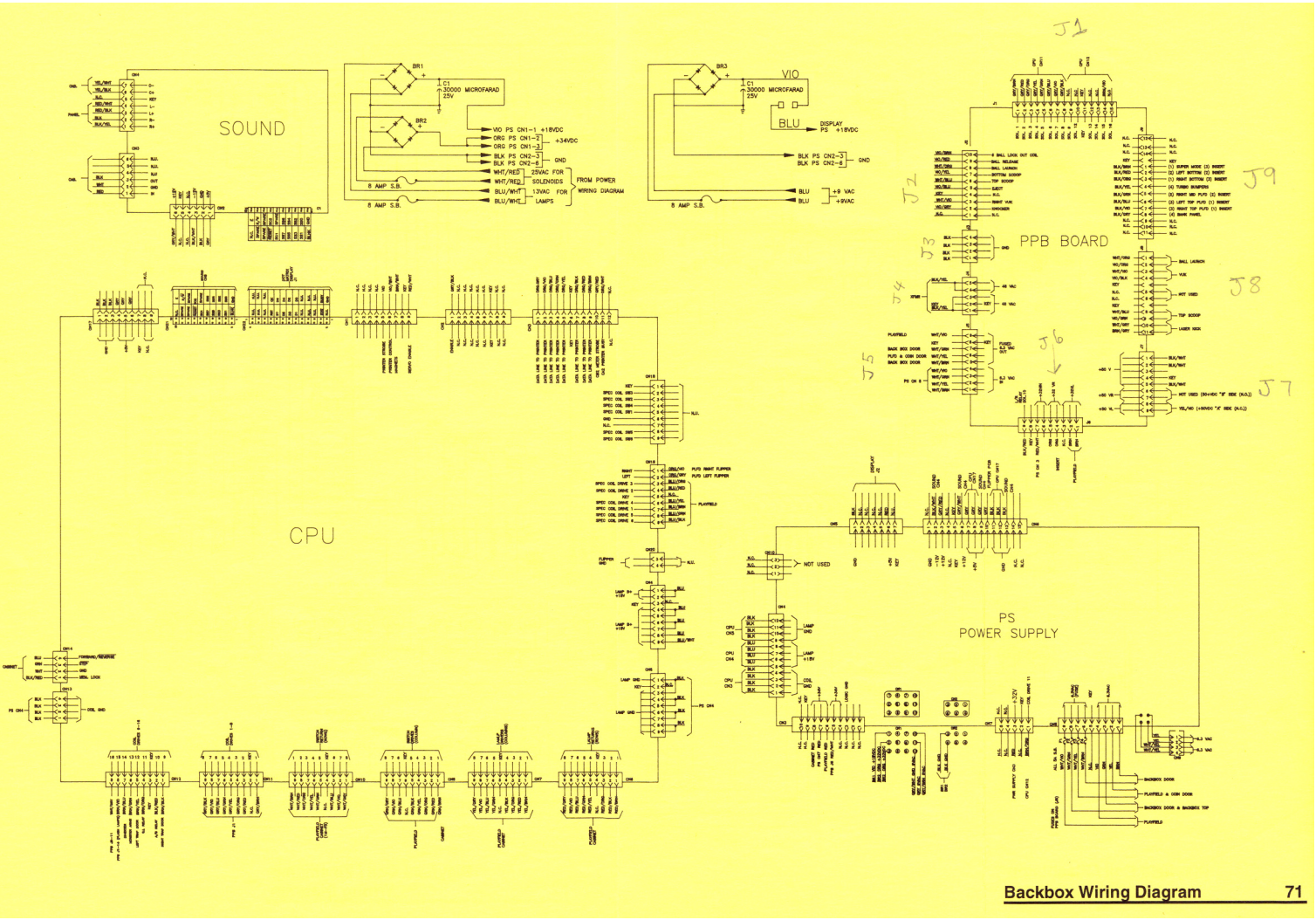

THIS CONFIGURATION FOR 115V
FOR LOWER LINE VOLTAGES
OR 220 VOLT OPERATION
SEE SAMPLES BELOW
BLK
1F1
8A SLO BLO
LINE FILTER
120/240V 50/60 Hz
SERVICE
OUTLET
1V1
VARISTER
130V
GRN
WHT
1L1
TO
$ BILL
VALIDATOR
1F/M1
1T1
JUMPER FOR VOLTAGE VARIATION
230/218/206 VOLTS
1F1= 4A SLO BLO
1V1=275V VARISTOR
100/105 VOLTS
1F1= 8A SLO BLO
1V1= 130V VARISTOR
206V
218/230V
WHT 206/218V
WHT 230V
REMOVE
PIN 9
1F/M2
CN1
GRY
GRY/WHT
GRY/GRN
9VAC
9VAC
18 VAC
FOR LOGIC
+12-12/
+5VDC
TO POWER
SUPPLY BOARD CN1
SSFB CN2
BLU
BLU
8A
SLO BLO
+18 VAC
FOR BIG
DOT MATRIX
DISPLAY
TO BRIDGE
RECTIFIER 3
BLU/WHT
BLU/WHT
13 VAC
FOR LAMPS
TO BRIDGE
RECTIFIER 1
WHT/RED
WHT/RED
INTERLOCK
SWITCH
25 VAC
FOR SOLENOIDS
TO BRIDGE
RECTIFIER 2
SN4
BLK/YEL
BLK/YEL
48 VAC
FOR FLIPPERS
TO PPB
BOARD
J4
1F/M3
2F2
YEL
YEL/WHT
6 VAC
FOR GI
LAMPS
TO POWER
SUPPLY BOARD
CN9

MSF073.psd

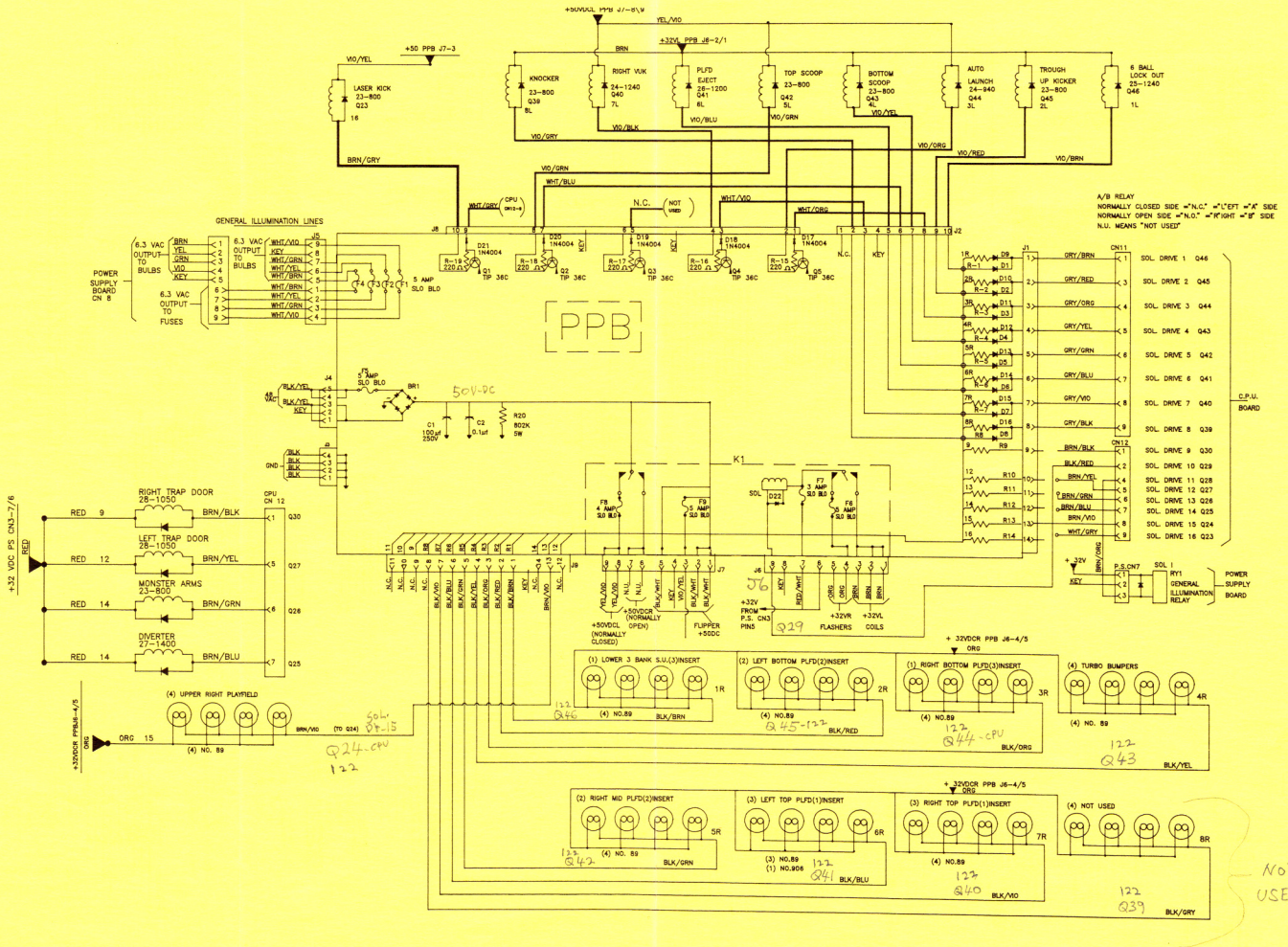


70 Cabinet Wiring Diagram

MSF074.psd

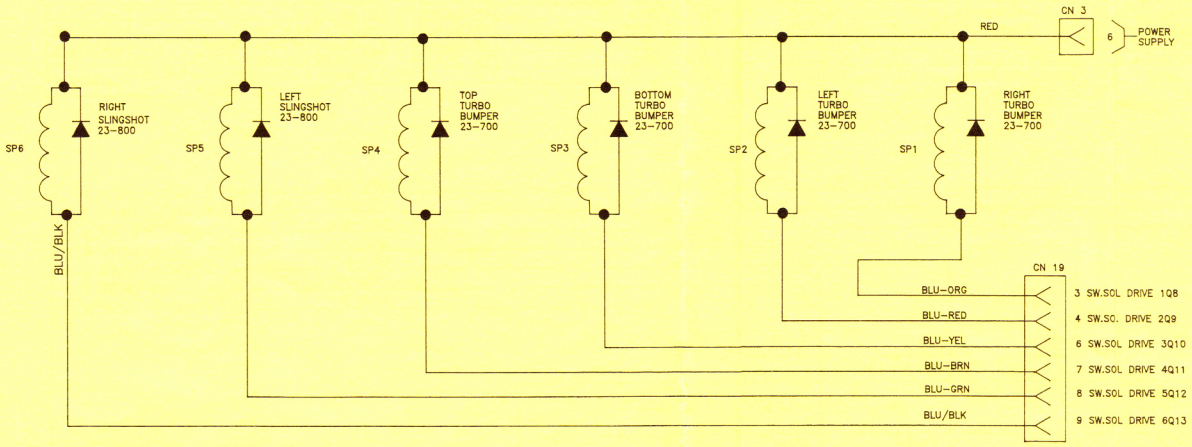

SOUND
CPU
PPB BOARD
PS
POWER SUPPLY
BR1
BR2
BR3
C1
30000 MICROFARAD
25V
8 AMP S.B.
VIO
BLU
DISPLAY
PS +18VDC
GND
+9 VAC
-9VAC
SOLENOIDS
LAMPS
FROM POWER
WIRING DIAGRAM
NOT USED
J1
J2
J3
J4
J5
J6
J7
J8
J9

MSF075.psd



72 Playfield Coil / Flashlamp Wiring Diagram

MSF076.psd


CN 3
RED
6
POWER SUPPLY
SP6
RIGHT SLINGSHOT 23-800
SP5
LEFT SLINGSHOT 23-800
SP4
TOP TURBO BUMPER 23-700
SP3
BOTTOM TURBO BUMPER 23-700
SP2
LEFT TURBO BUMPER 23-700
SP1
RIGHT TURBO BUMPER 23-700
BLU/BLK
CN 19
BLU-ORG
3 SW.SOL DRIVE 1Q8
BLU-RED
4 SW.SO. DRIVE 2Q9
BLU-YEL
6 SW.SOL DRIVE 3Q10
BLU-BRN
7 SW.SOL DRIVE 4Q11
BLU-GRN
8 SW.SOL DRIVE 5Q12
BLU/BLK
9 SW.SOL DRIVE 6Q13

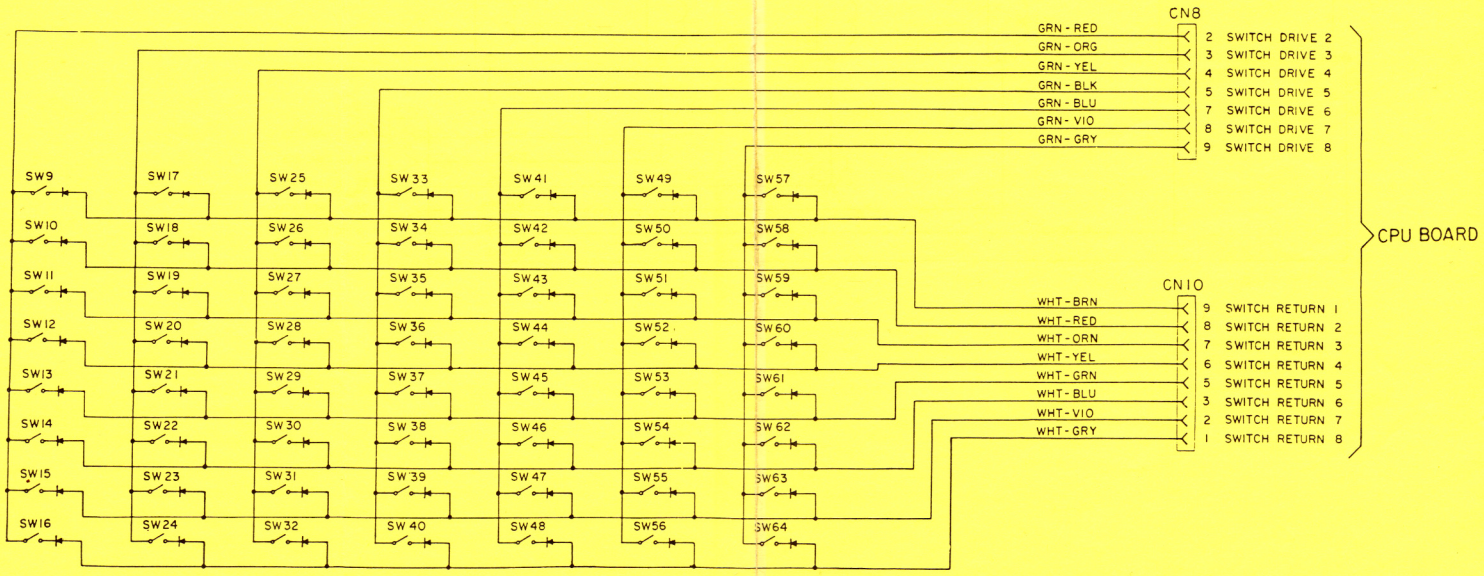
MSF077.psd

Switch Matrix No. & Description		Part No.
1*	Plumb Tilt (See Item 17, Cabinet Parts,	Page 41)
2*	4th Coin (On Coin Door)	---
3*	Credit Button (Left of Coin Door)	500-5097-02
4*	Right Coin (On Coin Door)	180-5024-00
5*	Center Coin (On Coin Door)	180-5024-00
6*	Left Coin (On Coin Door)	180-5024-00
7*	Slam Tilt	180-5022-00
8*	Extra Ball Button (Under 03)	180-5073-00
9	#1 (Left) Ball Trough	180-5119-00
10	#2 Ball Trough	180-5119-00
11	#3 Ball Trough	180-5119-00
12	#4 Ball Trough	180-5119-00
13	#5 Ball Trough	180-5119-00
14	#6 Ball Trough	180-5119-00
15	#7 (Right) Ball Trough	180-5118-00
16	Shooter Lane	180-5100-01

Switch Matrix No. & Description		Part No.
17	Bottom 2-Bank Stand-Up Left " F "	515-6027-08
18	Bottom 2-Bank Stand-Up Right " R "	515-6027-08
19	Middle 3-Bank Stand-Up Bottom " A "	515-5162-08
20	Middle 3-Bank Stand-Up Middle " N "	515-5162-08
21	Middle 3-Bank Stand-Up Top " K "	515-5162-08
22	Top 3-Bank Stand-Up Left " E "	515-5162-08
23	Top 3-Bank Stand-Up Middle " N "	515-5162-08
24	Top 3-Bank Stand-Up Top " S "	515-5967-08
25	Middle 1-Bank S-U "Move Jackpot"	515-6027-08
26	Ramp 1-bank Stand-Up Left " T "	515-5967-08
27	Ramp 1-bank Stand-Up Right " E "	515-5967-08
28	Right 2-Bank Stand-Up Top " I "	515-6027-08
29	Right 2-Bank Stand-Up Bottom " N "	515-6027-08
30	Not Used	— - — - —
31	Sarcophagus Upper Scoop	180-5057-00
32	Geneva Lower Scoop	180-5057-00
33	Left Orbit Rollover Bottom	500-5706-00

Switch Matrix No. & Description		Part No.
34	Left Orbit Rollover Top	500-5706-00
35	Right Orbit Rollover Top	500-5707-00
36	Right Orbit Rollover Bottom	500-5707-00
37	Left Outlane Rollover	500-5707-00
38	Left Return Rollover	500-5707-00
39	Right Return Rollover	500-5707-00
40	Right Outlane Rollover	500-5706-00
41	Top Turbo Bumper	180-5015-01
42	Middle Left Turbo Bumper	180-5015-01
43	Middle Right Turbo Bumper	180-5015-01
44	Bottom Turbo Bumper	180-5015-01
45	Ramp Entrance Gate	180-5090-00
46	Ramp Exit Gate	180-5087-00
47	Left Slingshot	180-5054-00
48	Right Slingshot	180-5054-00
49	Not Used	— - — - —

Switch Matrix No. & Description		Part No.
50	Not Used	— - — - —
51	Not Used	— - — - —
52	Not Used	— - — - —
53	"North Pole" VUK	180-5116-00
54	"Ingolstadt" Right Orbit Spinner	180-5010-04
55	"Ice Cave" above Ball Eject	180-5027-01
56	Mini-Orbit Rollover by Eject	500-5706-00
57	Not Used	— - — - —
58	Not Used	— - — - —
59	Not Used	— - — - —
60	Not Used	— - — - —
61	Not Used	— - — - —
62	"The Switch" Lever	180-5111-00
63*	Lower Left Flipper Cabinet via Q7 (Transistor) on SSFB	180-5124-01
64*	Lower & Upper Right Flipper Cabinet via Q5 (Transitor) on SSFB	180-5124-01



74 Playfield Switch Wiring Diagram

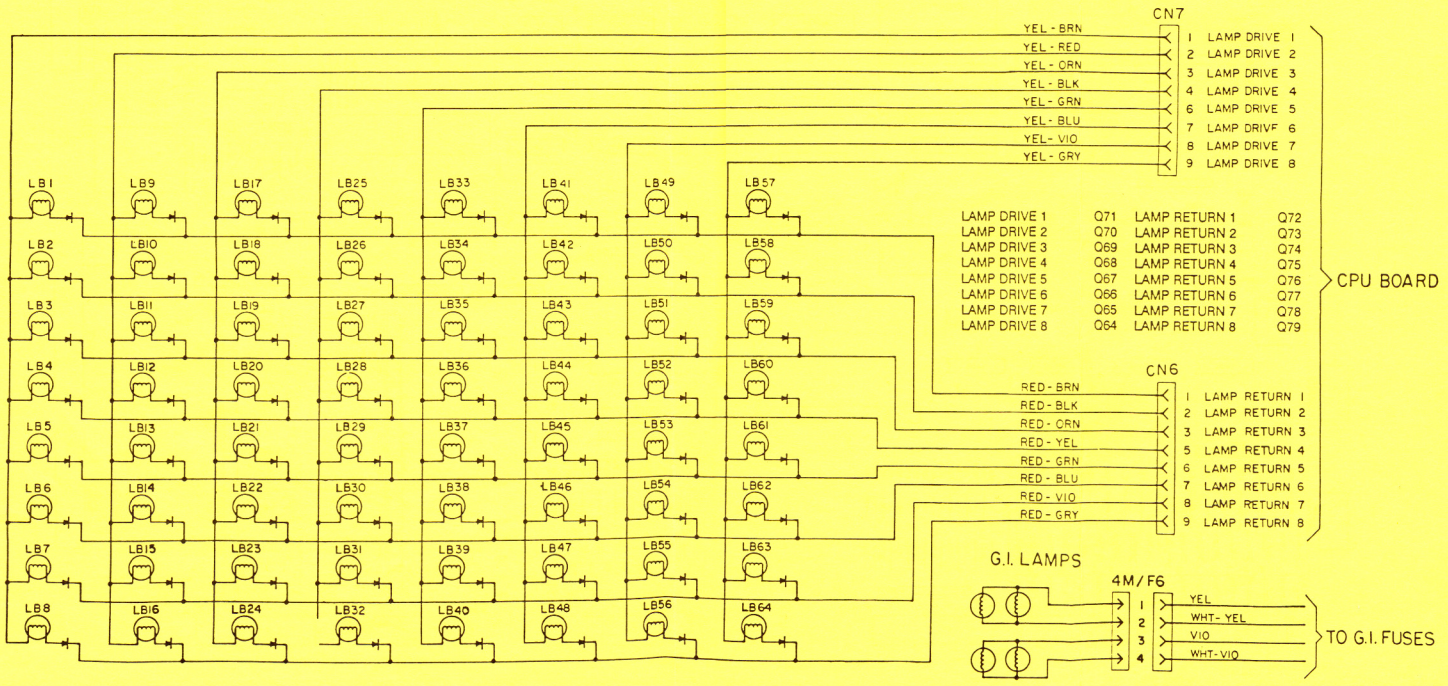
74 Playfield Switch Wiring Diagram

Lamp Matrix No. & Description	
01	**F** of : FRANKENSTEIN
02	**R** of : FRANKENSTEIN
03	**A** of : FRANKENSTEIN
04	**N** of : FRANKENSTEIN
05	**K** of : FRANKENSTEIN
06	**E** of : FRANKENSTEIN
07	**N** of : FRANKENSTEIN
08	**S** of : FRANKENSTEIN
09	**T** of : FRANKENSTEIN
10	**E** of : FRANKENSTEIN
11	**I** of : FRANKENSTEIN
12	**N** of : FRANKENSTEIN
13	Top Turbo Bumper
14	Middle Left Turbo Bumper
15	Middle Right Turbo Bumper
16	Bottom Turbo Bumper

Lamp Matrix No. & Description	
17	Frankenstein Millions
18	Stoning Mode
19	Creature Feature Mode
20	Lynch Justine Mode
21	North Pole Mode
22	Lite Extra Ball Mode
23	Voltage Mode
24	Graveyard Mode
25	Ramp Jackpot
26	North Pole VUK Jackpot
27	Ice Cave Ball Eject Jackpot
28	Left Orbit Jackpot
29	Geneva Lower Scoop
30	Sarcophagus Upper Scoop
31	VUK Entrance Left
32	VUK Entrance Right

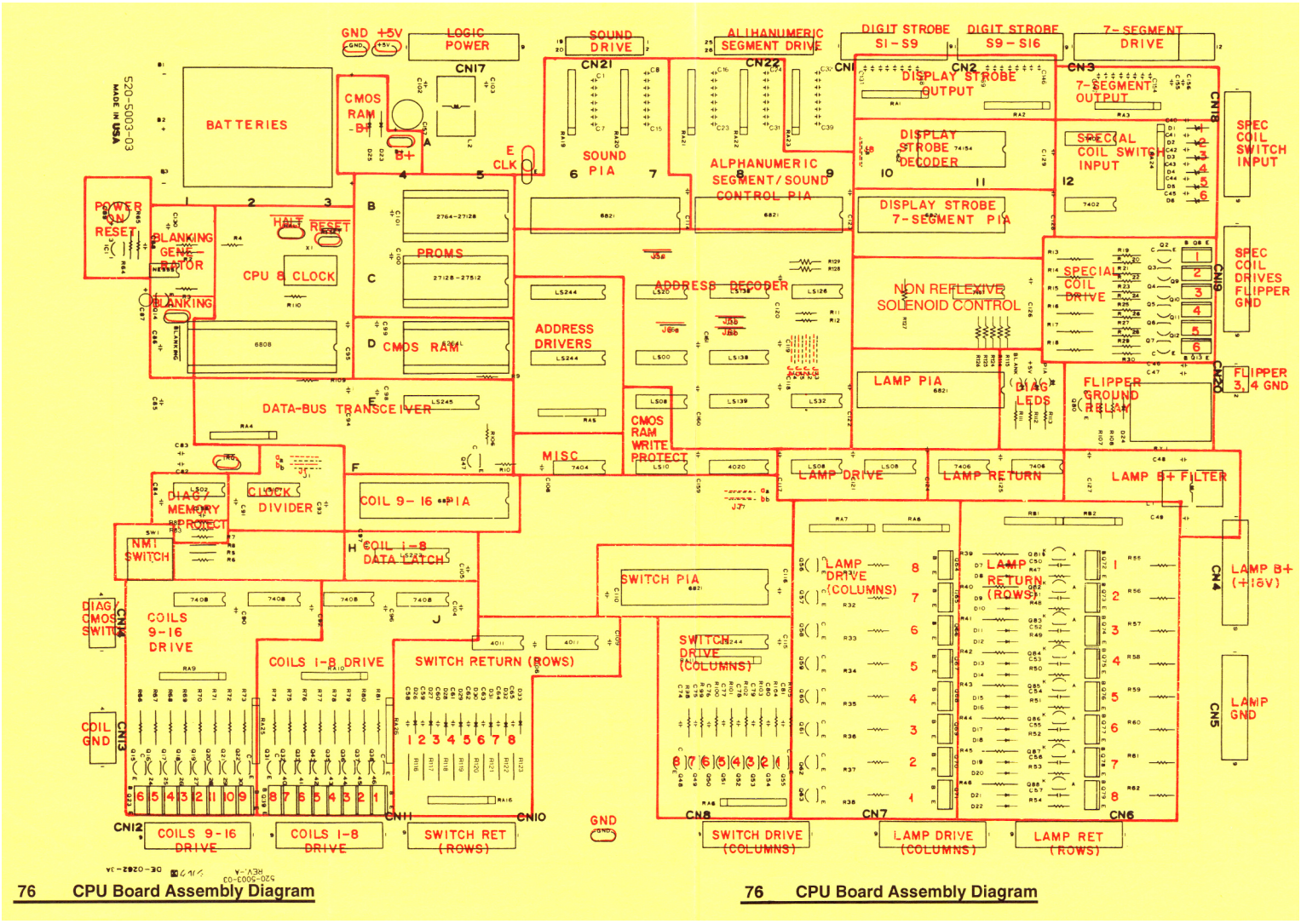
Lamp Matrix No. & Description	
33	Left Outlane Alive Kick-Back
34	Left Outlane Special
35	Lt. Return Lane Lite Ingolstadt
36	Rt. Return Lane Lite Geneva
37	Right Outlane Double Bonus
38	Ice Cave Mode
39	Lite Lock 1
40	Lite Lock 2
41	Move Jackpot
42	Change Scene
43	Ingolstadt Spinner Mode
44	Jackpot Grows
45	Justine Mode
46	Extra Ball
47	Creature Mode
48	Shooter Lane

Lamp Matrix No. & Description	
49	Not Used In This Game
50	Not Used In This Game
51	Not Used In This Game
52	Not Used In This Game
53	Not Used In This Game
54	Not Used In This Game
55	Live Again (Shoot Again)
56	VUK Entrance Middle
57	Not Used In This Game
58	Not Used In This Game
59	Not Used In This Game
60	Not Used In This Game
61	Not Used In This Game
62	Not Used In This Game
63	Extra-Ball Button (Buy-a-Ball)
64	Start Button



Playfield Lamp Wiring Diagram **75**

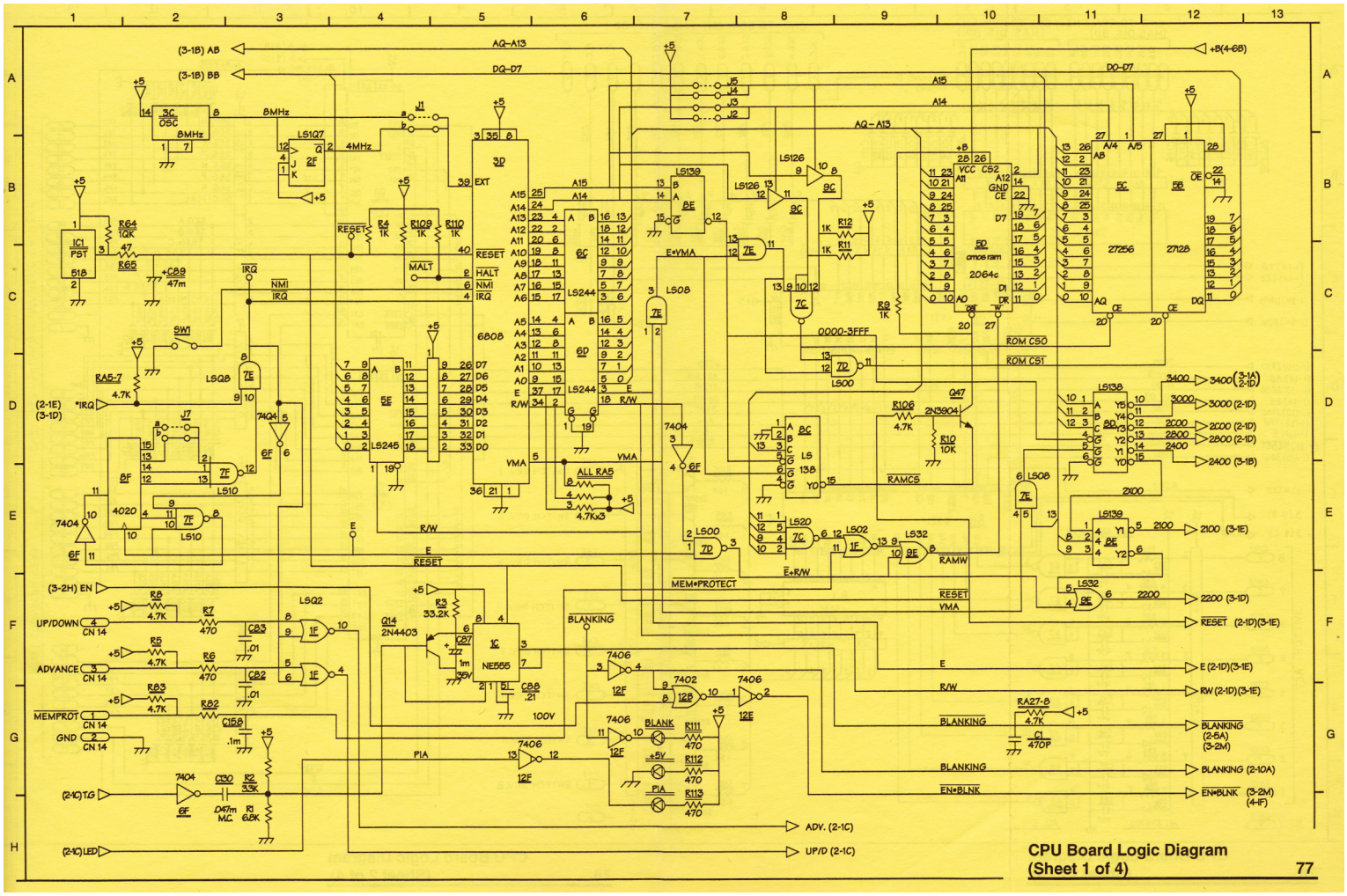
MSF079.psd



76 CPU Board Assembly Diagram

76 CPU Board Assembly Diagram

MSF080.psd



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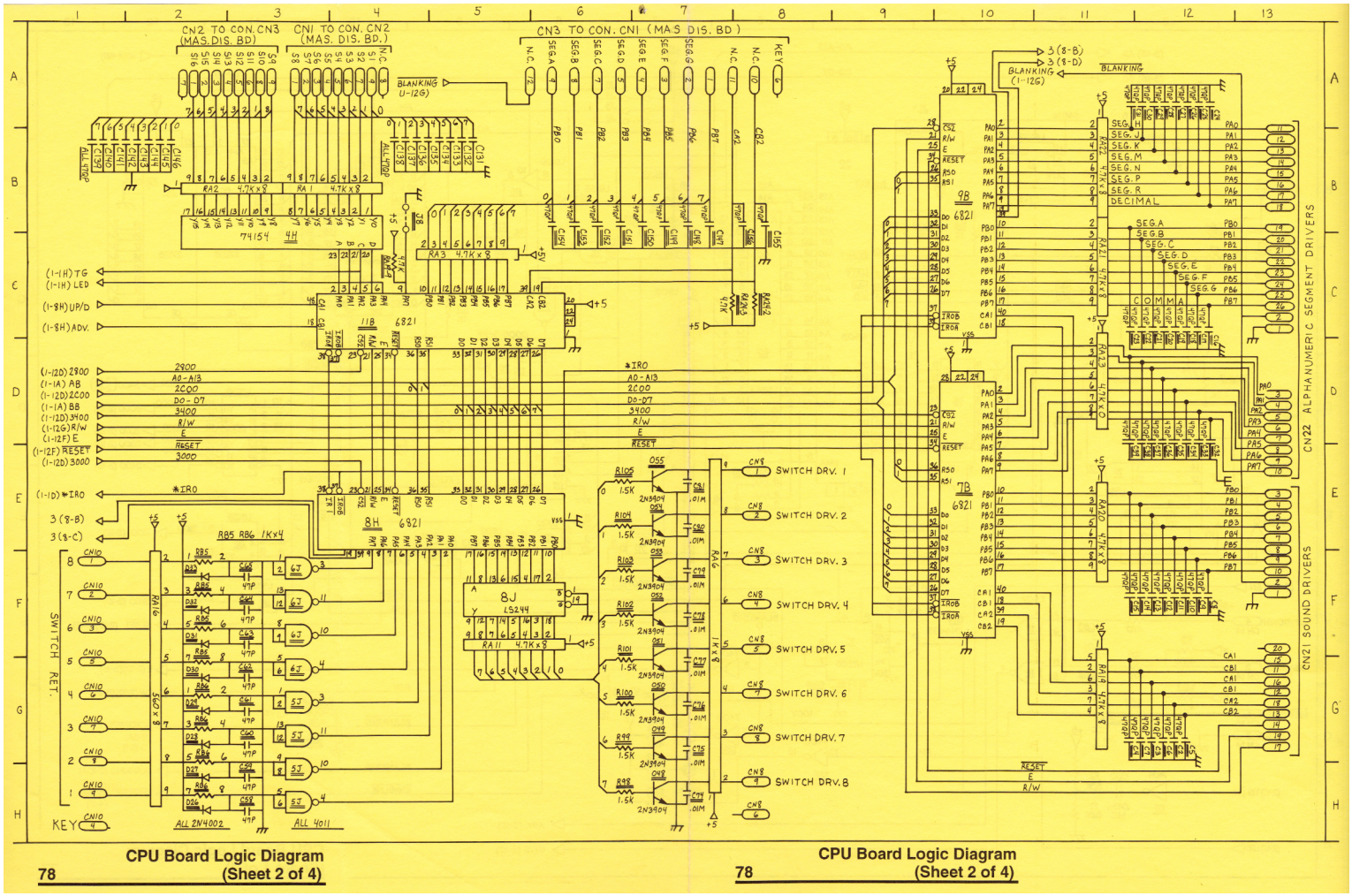
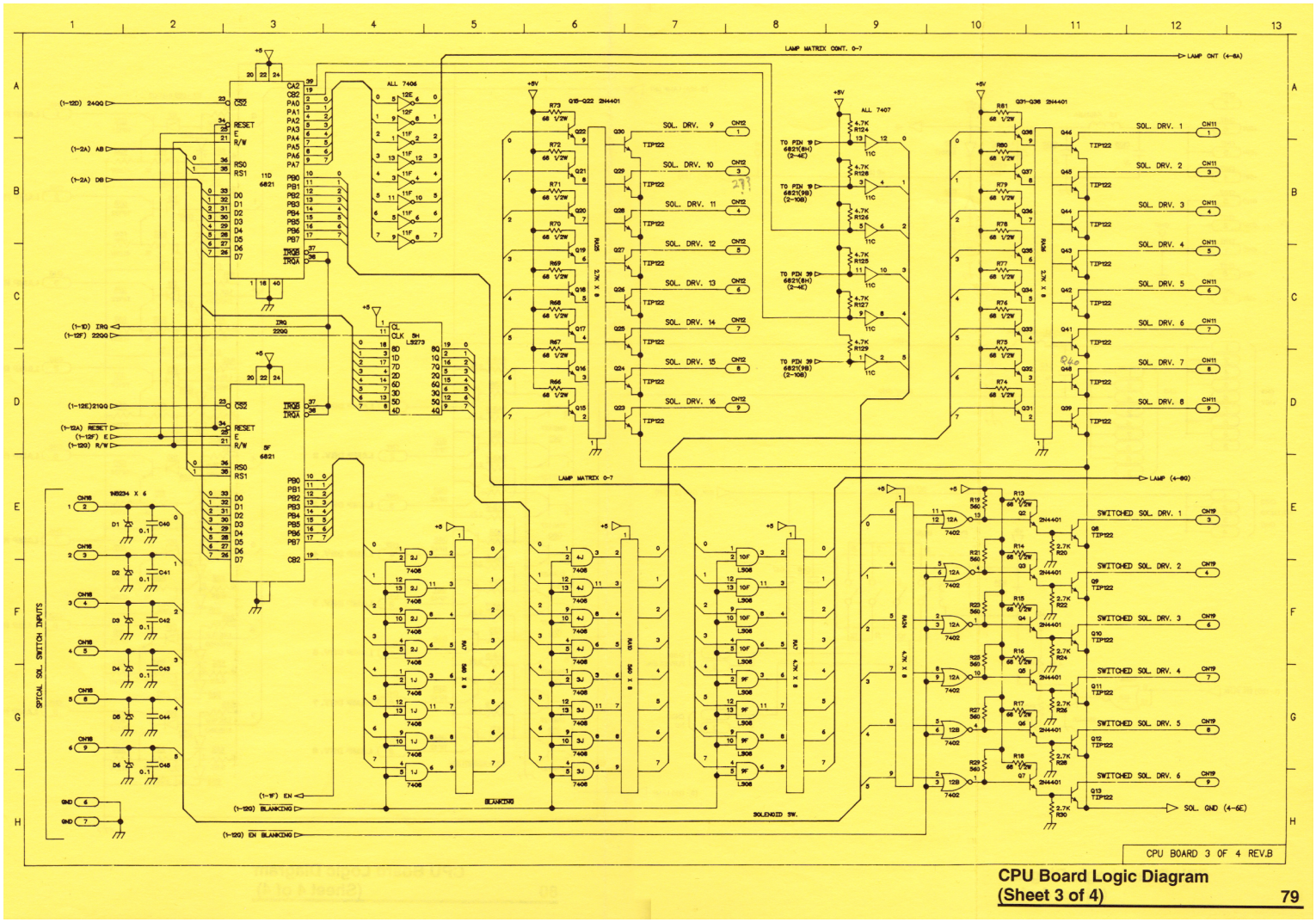


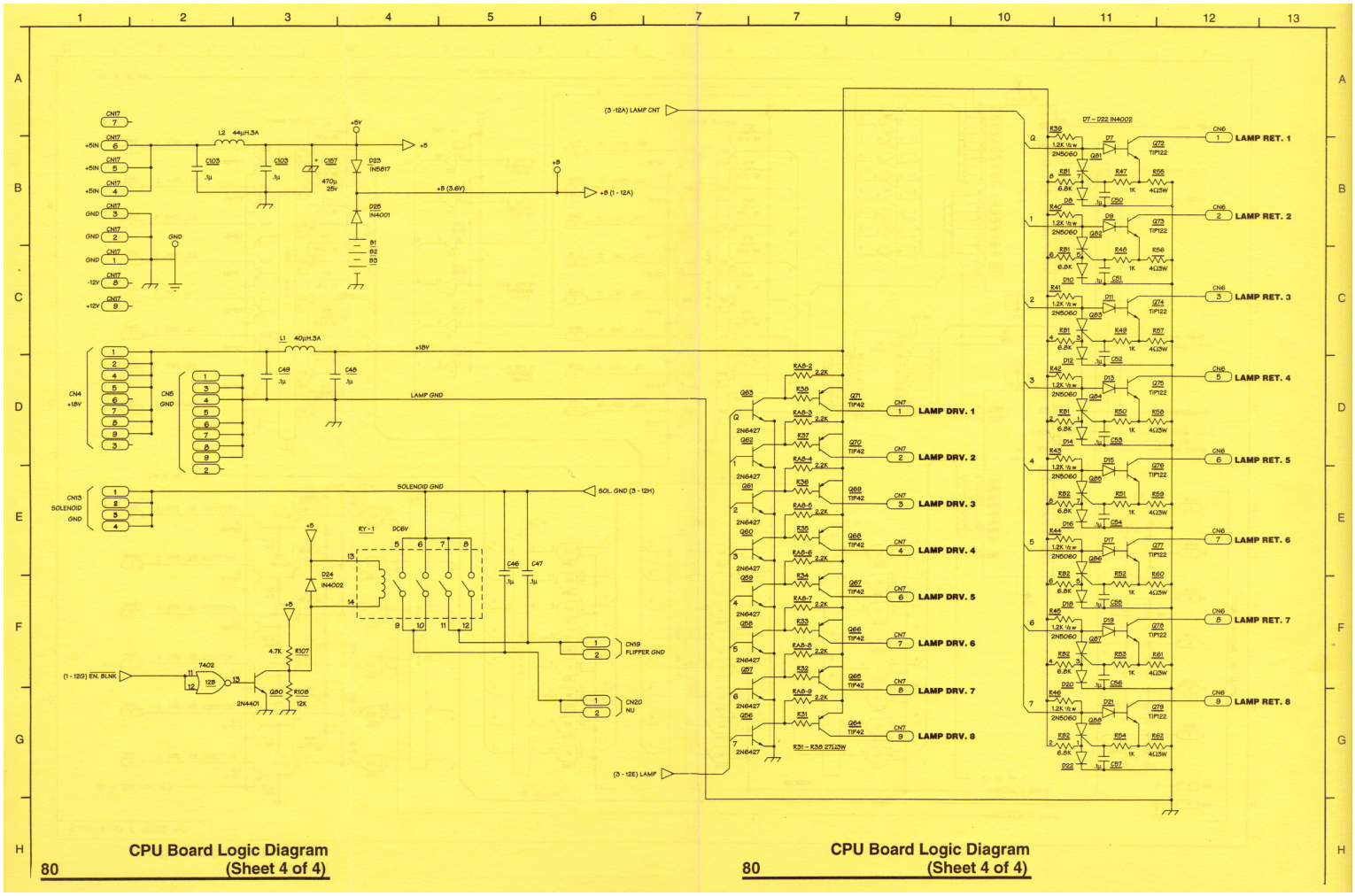
CPU Board Logic Diagram
78 (Sheet 2 of 4)

CPU Board Logic Diagram
78 (Sheet 2 of 4)



CPU Board Logic Diagram (Sheet 3 of 4) 79

MSF083.psd



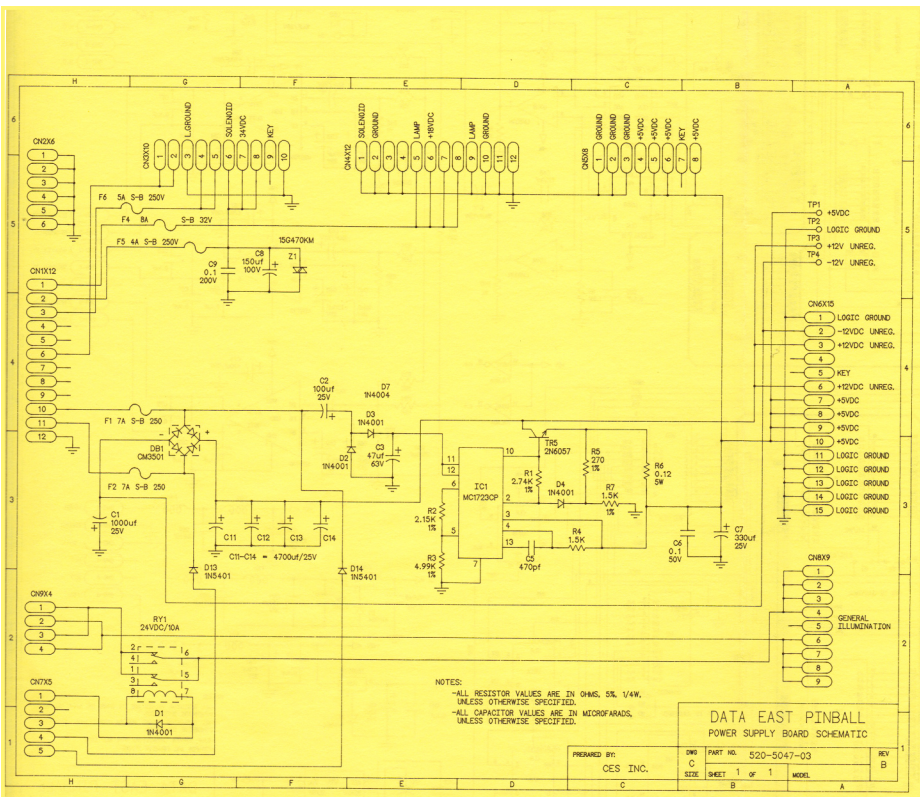
CPU Board Logic Diagram (Sheet 4 of 4)

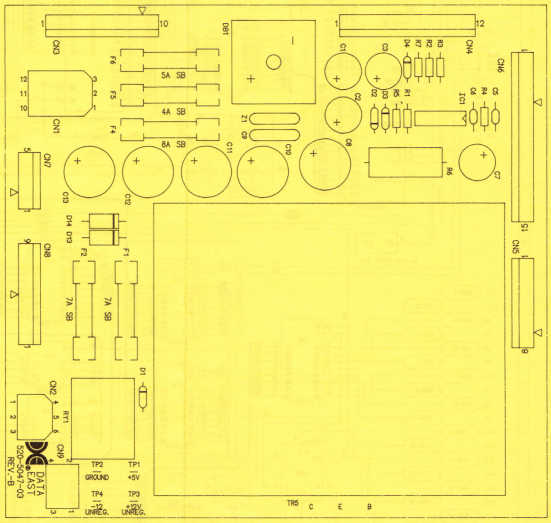
80

CPU Board Logic Diagram (Sheet 4 of 4)

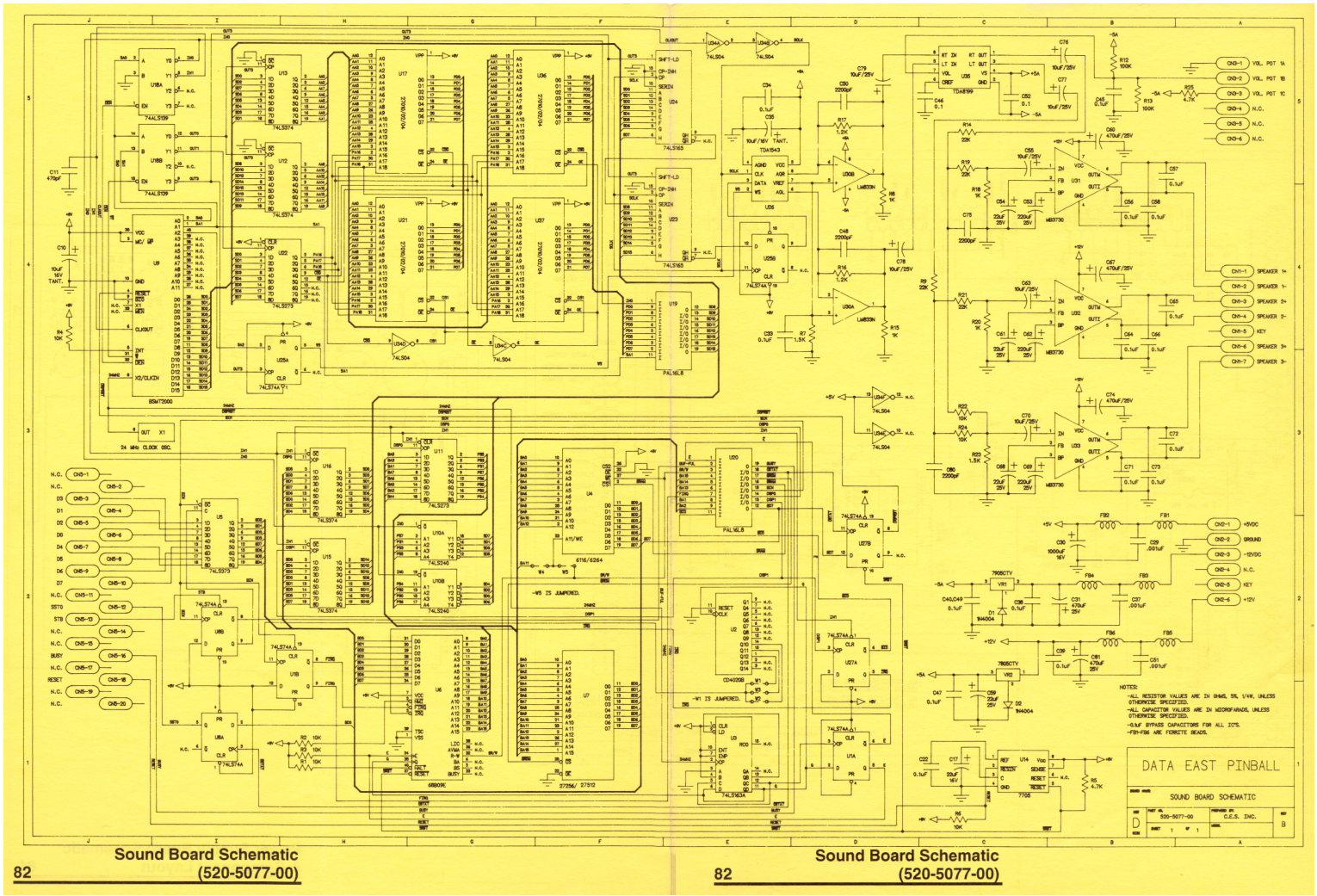
80

MSF084.psd



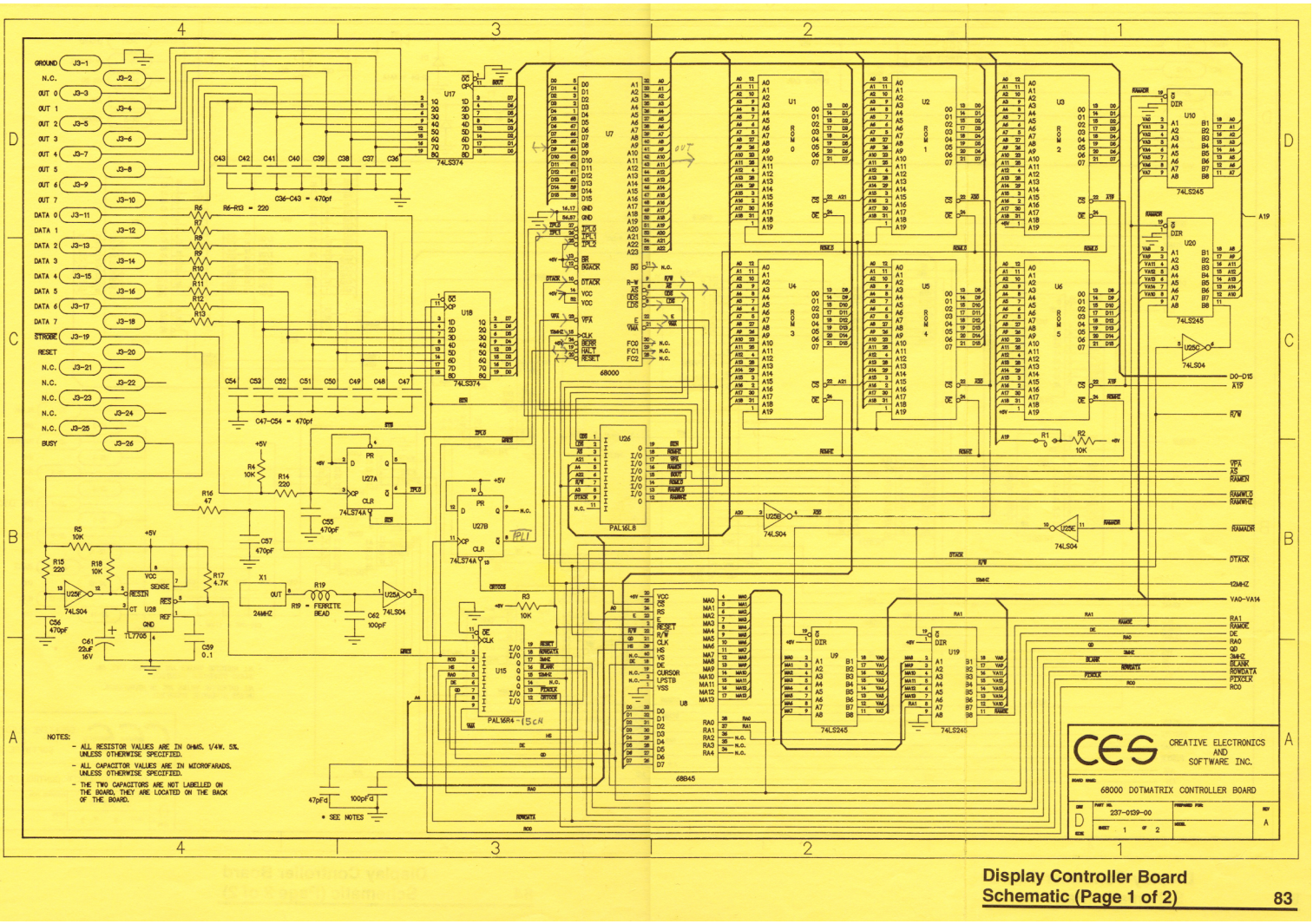


Power Supply Board Schematic & Component Layout 81

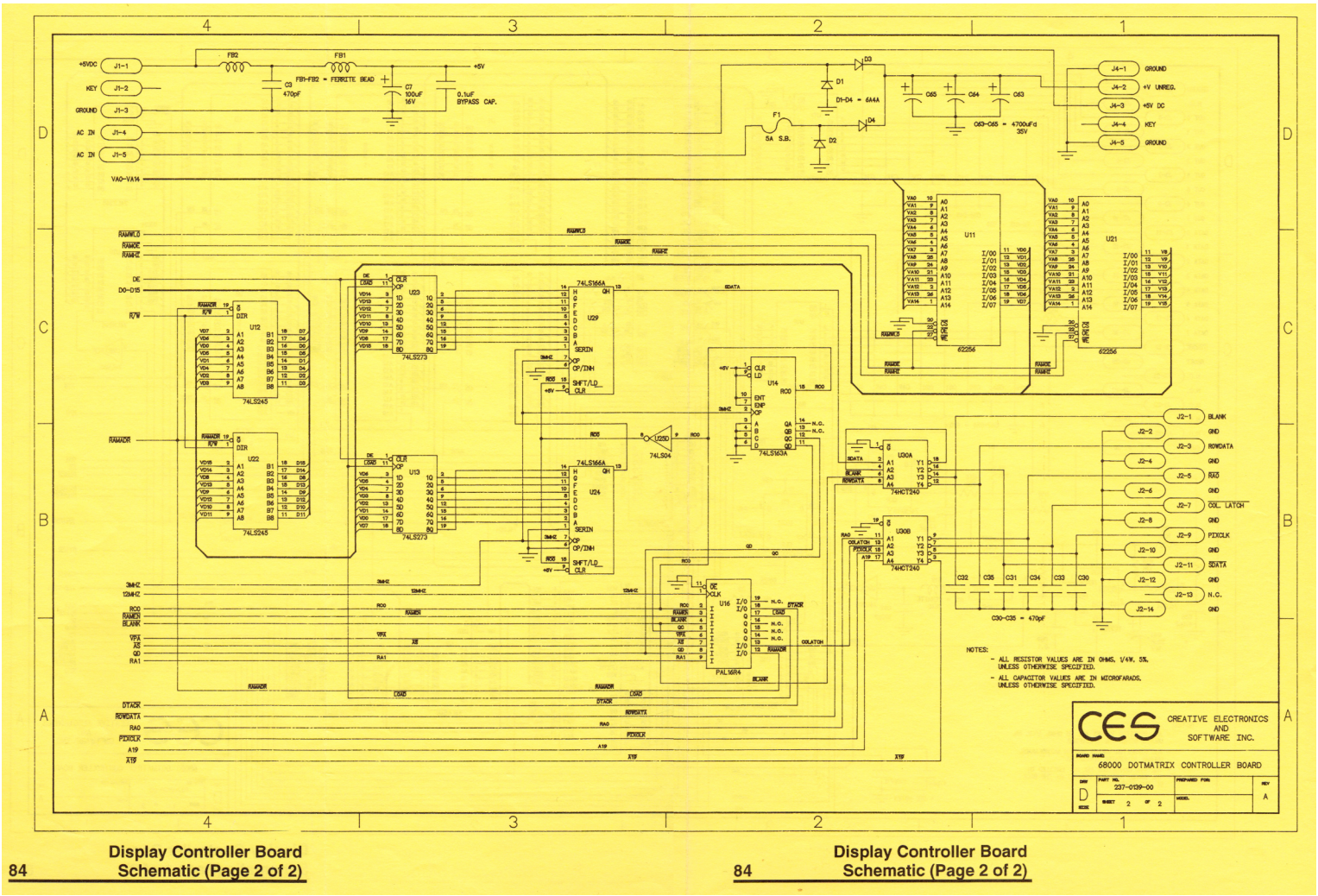


82 Sound Board Schematic (520-5077-00)

MSF086.psd



Display Controller Board Schematic (Page 1 of 2) 83



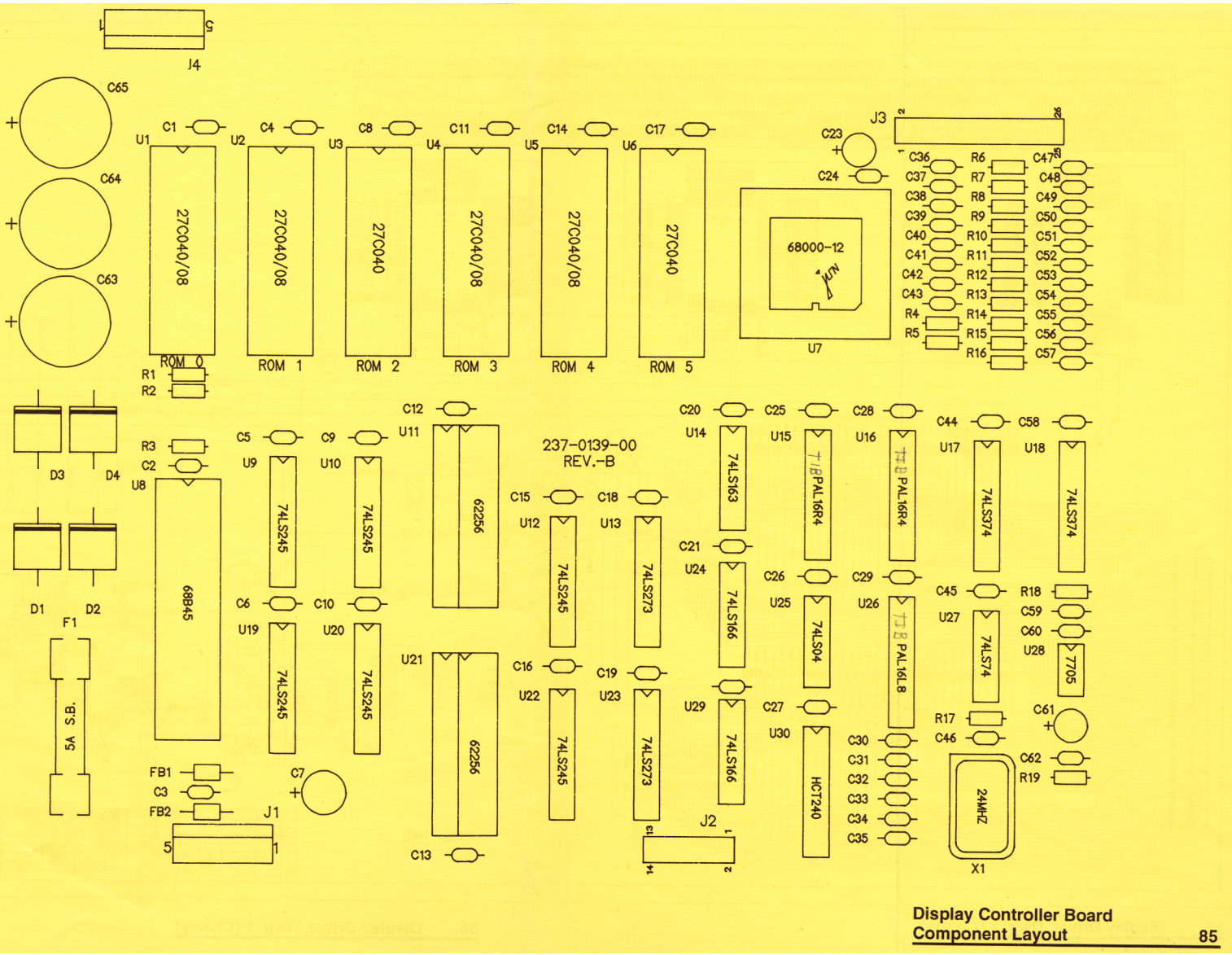
Display Controller Board Schematic (Page 2 of 2)

84

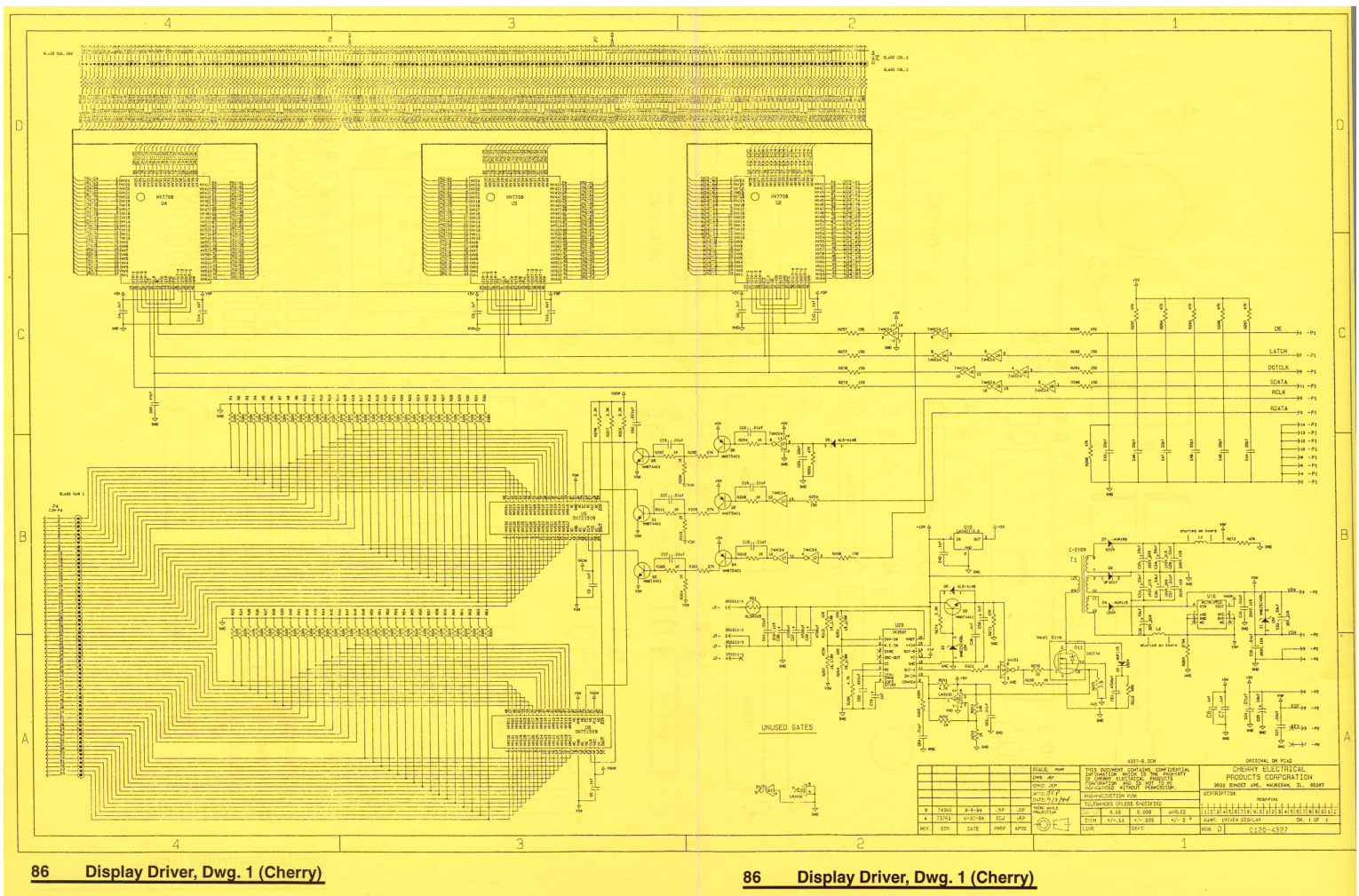
Display Controller Board Schematic (Page 2 of 2)

84

MSF088.psd

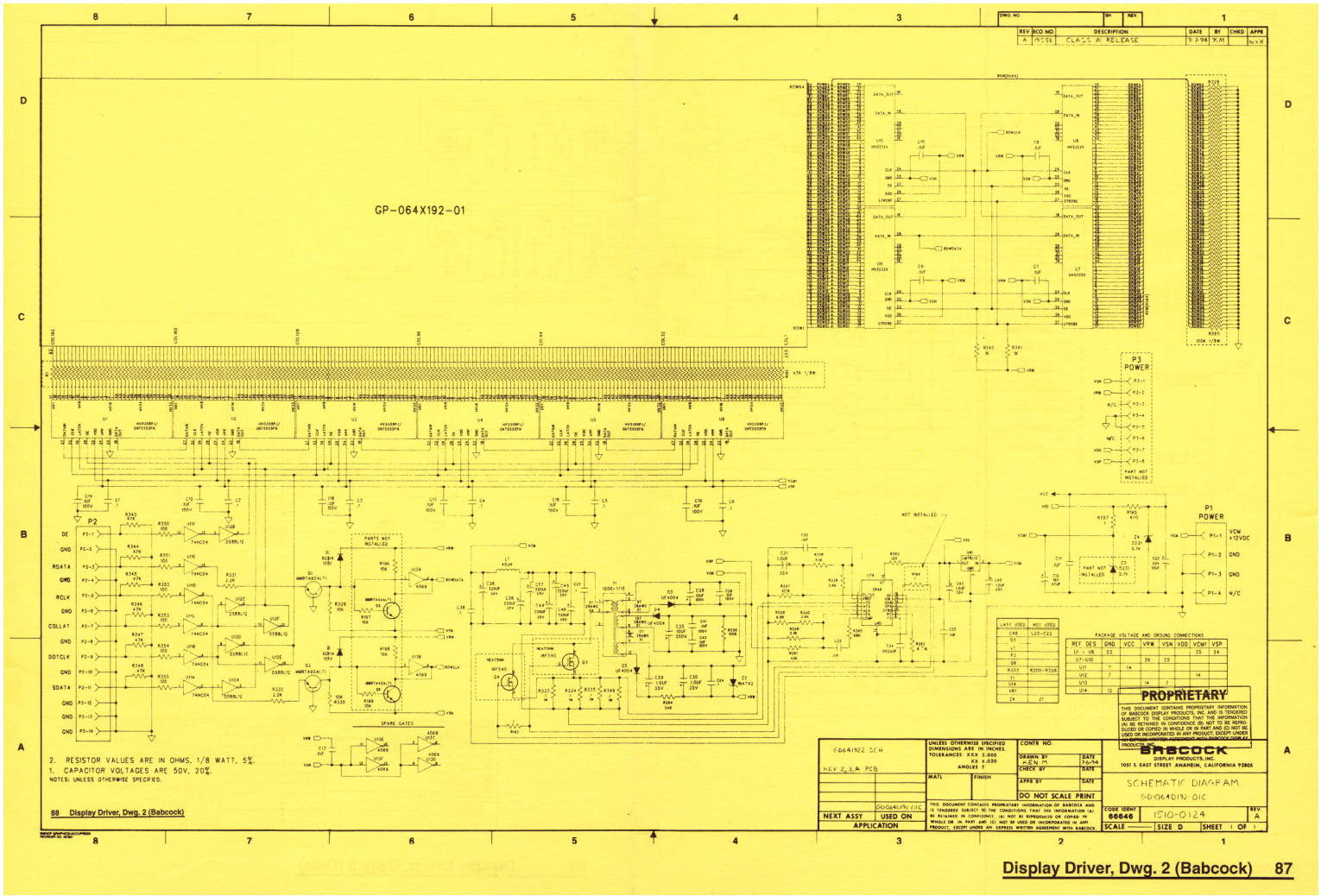


Display Controller Board
Component Layout 85



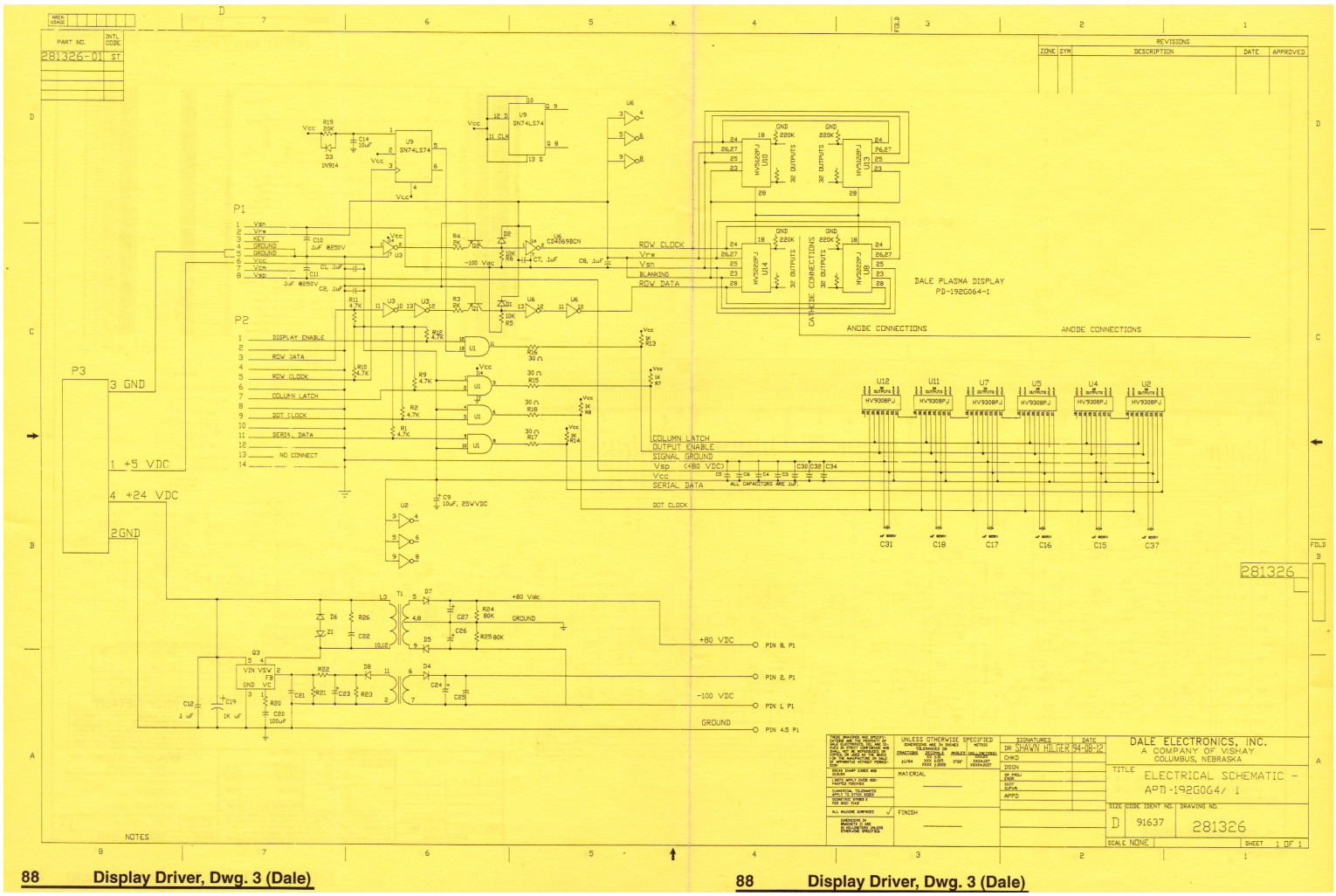
86 Display Driver, Dwg. 1 (Cherry)

86 Display Driver, Dwg. 1 (Cherry)



88 Display Driver, Dwg. 2 (Babcock)

MSF091.psd



88 Display Driver, Dwg. 3 (Dale)

88 Display Driver, Dwg. 3 (Dale)

New Solid State Flipper Board

We have redesigned our Solid State Flipper Board (S.S.F.B.) so that a misadjustment or failure of the End-of-Stroke (E.O.S.) Switch will not affect the operation of the flippers. The flippers will still work! The E.O.S. switch is strictly an added feature, not a functional part of the circuit (see E.O.S. Theory of Operation).

Theory of Operation for the Solid State Flippers

The Solid State Flipper Board is a Multiple Flipper Solenoid Driver Circuit. Each solenoid driver circuit contains a One Shot Timer, a 50V Driver, and an 8V Driver.

Looking at one circuit, Schmidt NAND gates U1A, U1b, and U1D make up the One Shot Timer. The timer length is controlled by R10, R33 and C2. The output of the timer is gated at U1C with the buffered switch input from Q6. The output of U1C controls the 50V driver circuit consisting of Q4, Q1, Q2, Q3, and D1. As long as the flipper button is activated, Q6 will keep the 8V driver circuit, SR1, on.

The 50 volts provides the actuation power to the flipper solenoid while the 8 volts provides the holding power.

E.O.S. Switch Theory of Operation

The End of Stroke (E.O.S.) Switch used in our flipper circuit is a Gold Peened Contact, Blade Switch Assembly, mounted on the flipper assembly.

Electrically, it is connected in series with the Cabinet Flipper Switch and the Flipper E.O.S. input on the Solid State Flipper Board (S.S.F.B.) connector CN1 which enables the 50 Volt DC Drive Circuit.

Refering to the Flipper Wiring Diagram, one side of the Flipper Cabinet Switch is connected to ground (BLK-Wire), the other side (BLU-VIO Wire) is connected to the flipper switch input on the S.S.F.B. connector CN1 which enables your 9 Volt DC holding voltage and is connected in series to the E.O.S. switch which is a normally closed switch.

The function of the E.O.S. switch is to prevent the flipper bat from being knocked back by a high velocity shot on the playfield. If while holding the flipper in the up position, the bat is moved back 1/16" or more, the E.O.S. switch will close giving the coil another 50 Volt pulse.

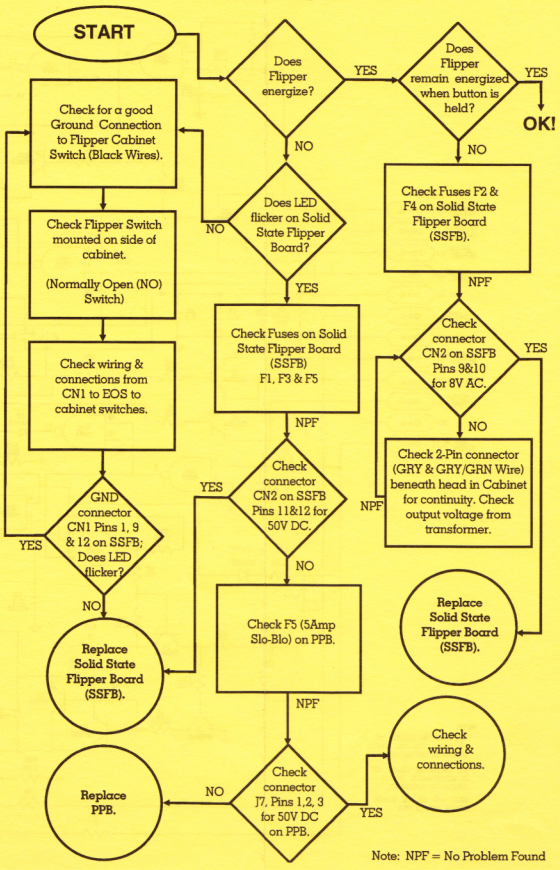
E.O.S. Switch Adjustment

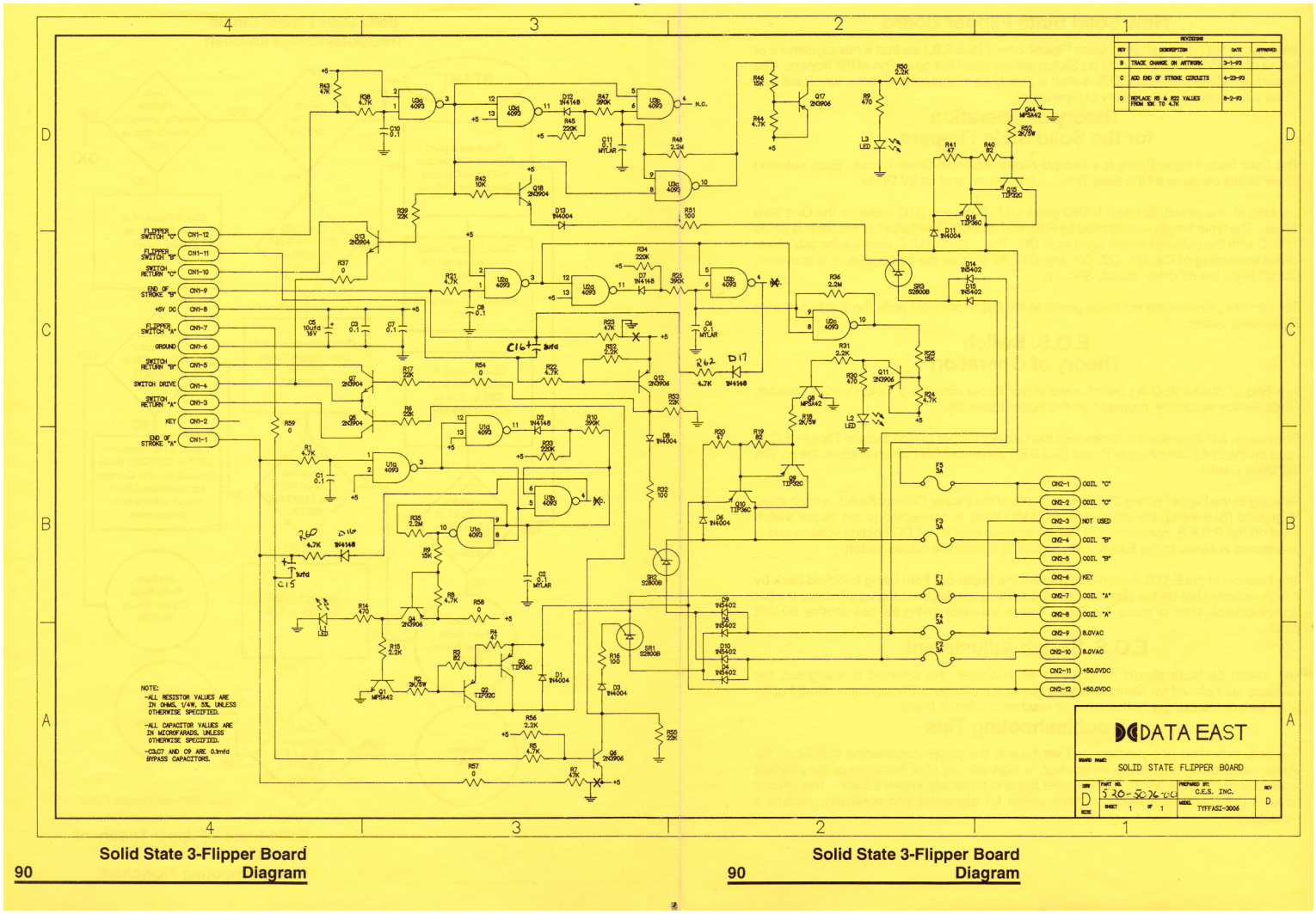
The switch contacts should be adjusted so that when the solenoid is energized, the contacts stay closed for almost the full travel of the plunger. The contacts should open 1/16" before the plunger bottoms out or reaches maximum travel.

Troubleshooting Tips

The only indication of a problem you will have is the player complaining that when the flipper bat is being held in the up position, a high velocity shot from one of the playfield solenoids causes the ball to hit the flipper bat and physically knock it back. This will not occur if the E.O.S. is working. Check switch for alignment and continuity, replace if necessary.

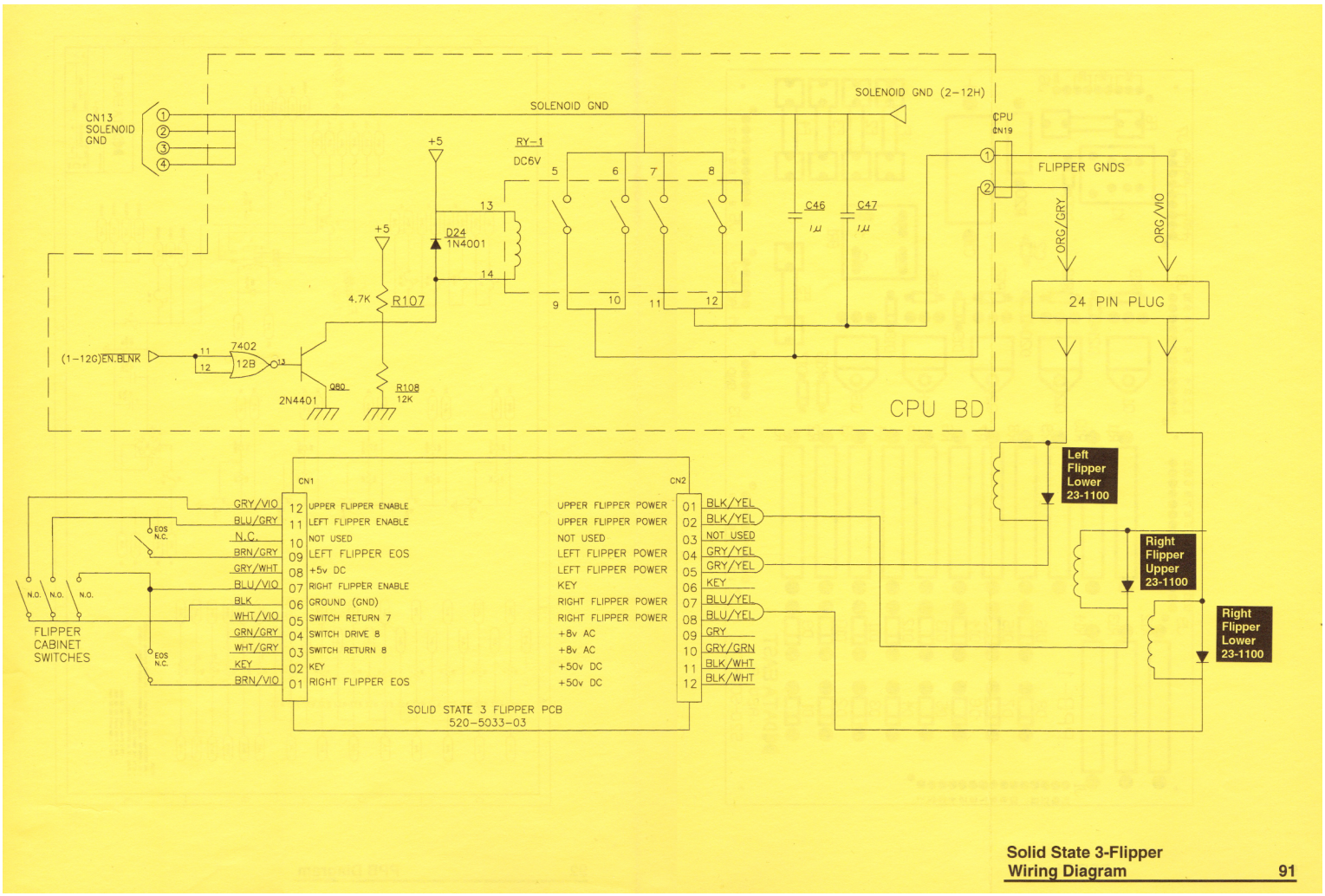
Solid State Flipper Circuit Troubleshooting Flowchart





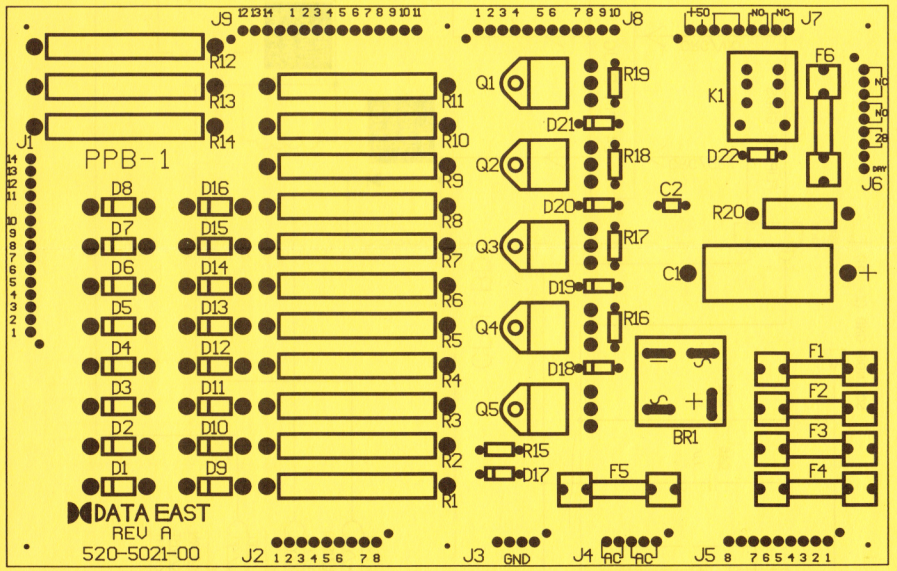
90 Solid State 3-Flipper Board Diagram

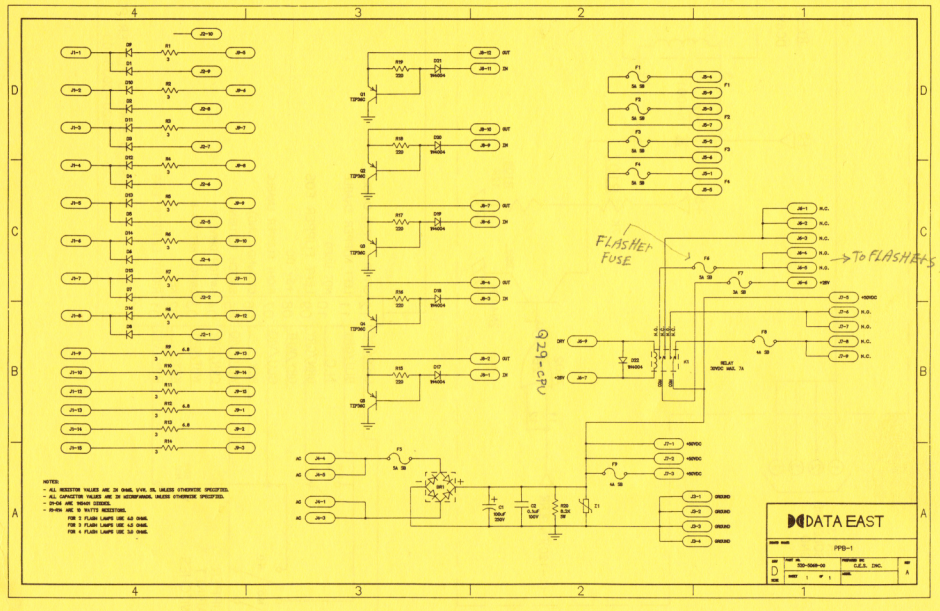
MSF094.psd



Solid State 3-Flipper Wiring Diagram 91

MSF095.psd


PPB-1
DATA EAST
REV A
520-5021-00
J1
J2
J3
GND
J4
AC
AC
J5
J6
J7
J8
J9
K1
BR1
C1
C2
R20
F1
F2
F3
F4
F5
F6
Q1
Q2
Q3
Q4
Q5
D21
D22
D20
D19
D18
D17
R19
R18
R17
R16
R15
R14
R13
R12
R11
R10
R9
R8
R7
R6
R5
R4
R3
R2
R1
D8
D7
D6
D5
D4
D3
D2
D1
D16
D15
D14
D13
D12
D11
D10
D9


FLASHER FUSE
To FLASHERS
G29-CPU
DATA EAST
PPB-1

MSF096.psd

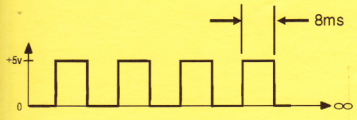
Creature Head Motion Servo Board

Theory of Operation

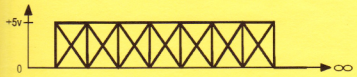
Serial Data is clocked out of the Main CPU Board to the Monster Head Motion Servo Board at 125 BPS. The data is accompanied by a Transition-Sensitive Clock (both rising and falling transitions) and an Active-High Enable. The CPU sends 8-bit Data Words to the Servo Board to trigger pre-recorded routines stored in the Micro-Controller on the Servo Board itself.

Since the clock is Transition-Sensitive, there are only 4 pulses on the clock for each 8-bit Data Word as shown:

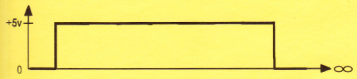
Input from CPU



Clock (Ref. Servo Bd. CN1-2)



Data (Ref. Servo Bd. CN1-3)

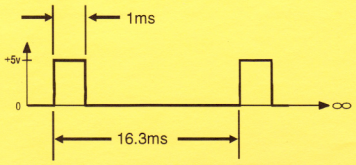


Enable (Ref. Servo Bd. CN1-4)

Data is sampled a fraction of a second after each transistion to insure a stable read of the Data State.

The signal to the Servo Motor consists of a short pulse of +5v ranging in duration from .3 to 1.7 milliseconds, repeating every 16.3ms. The duration of the short pulse determines the Servo's position - at 1 millisecond the Servo is centered. On power-up, the Servo Board will blink it's LED a few times and then send centering signals to all 4 of it's Servo's until it receives a command code from the CPU. (Note: Only Servo Output #1 is being used for the Creature.)

The signals should look like this:

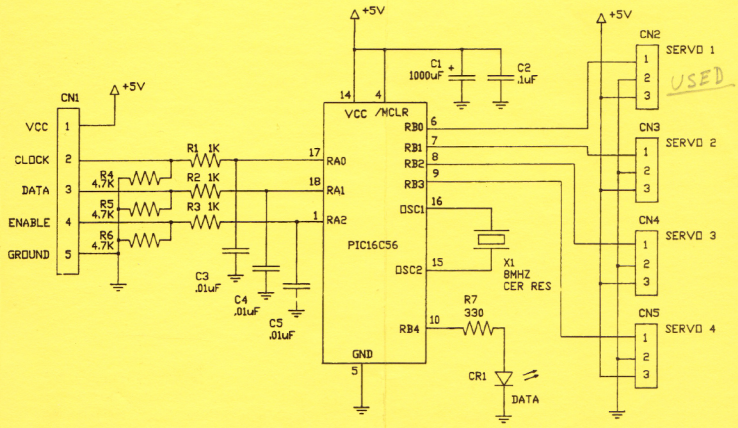


Output to Servo Motor

Theory of Operation

Monster Head Motion Board, PN. 520-5113-00

Only Servo Output #1 is being used for the Creature



94 This Page Is Blank