

Williams®

16P-517-101
Game No. 517
November, 1982

DEFENDER

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SPECIAL CONSIDERATIONS WHEN REPLACING CIRCUIT BOARDS

CPU Board

1. Revision level 7 CPU Boards (batteries located on lower left corner at board) or later boards must be used.
2. Must be equipped with blue-labeled Flipper ROMs and blue-labeled Game ROMs.
3. Jumpers W3, W10, W11, W14, W17, W19, W20, and W22 must be connected. Jumpers W4, W9, W12, W15, W16, W18, W21, and W23 must be removed. With the exception of W25, (Factory Setting Jumper) all other jumpers are not changed.

Driver Board

Must be equipped with zero-ohm resistors or wire jumpers (W9-W16) in place of switch matrix drive series resistors R204-R211.

Sound Board

Must be jumpered for ROM operation and be equipped with Sound ROM 15. (Jumpers W2, W5, W7, W9, W10, W12, and W15 connected; W3, W4, W6, W11, and W13 removed).

Power Supply Board

1. Model D 8345 board required (equipped with relay).
2. Fuse F4 (10A SB) for flipper solenoids must be installed.

Display Boards

Model C 8363 Master Display and 7-digit Slave Displays required.

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Installation

With legs attached to cabinet, proceed as follows:

1. Unlock and remove backglass from backbox.
2. Remove shipping insert and shipping blocks from insert door.
3. Unlatch and open insert door.
4. Unlatch speaker panel, disconnect speaker cable, and remove speaker panel.
Close and latch insert door.
5. Reach into the cabinet pedestal hole and pull up the line cord. Insert the line cord into the notch in the cabinet pedestal. DO NOT PLUG IN AT THIS TIME.
6. Position backbox face-down on top of cabinet with neck opening facing rear of cabinet.
7. Pull five cable connectors from backbox.
8. Reach into pedestal hole of cabinet, pull up ground strap braid wire, and push it into backbox.
9. Remove ties securing cabinet and playfield cables to cabinet and pull these cables up through pedestal hole.
10. Interconnect cabinet and playfield cables with those of backbox. All are shape, size and color-coded:
 - General Illumination Connector: 6-Pin WHITE
 - Switch Connector: 15-Pin WHITE
 - Lamp Connector: 24-Pin WHITE
 - Solenoid Connector: 36-Pin BLACK
 - Cabinet Connector: 36-Pin WHITE
11. Push Remote Volume Control Cable (GRAY), terminated in a 4-Pin connector, and Transformer Secondary Harness, terminated in four connectors: 2-Pin WHITE, 6-Pin BLUE, 9-Pin WHITE, and 12-Pin WHITE into backbox.
12. Lift up backbox and position on cabinet pedestal, engaging brackets for support.
13. Secure backbox to cabinet using two bolts and related washers.
14. Connect ground braid, and WHITE-RED wire under wing nut and washer at bottom of backbox.
15. Guide Remote Volume Control Harness through harness clips on back of backbox and connect 4 Pin connector to Sound Board 10J4.
16. Connect Transformer Secondary cable connectors:
 - 6-Pin BLUE (7 wires) to 6-Pin WHITE (7 wires)
 - 12-Pin WHITE to Power Supply 3J1
 - 2-Pin WHITE to Power Supply 3J9
 - 9-Pin WHITE to Sound Board 10J1

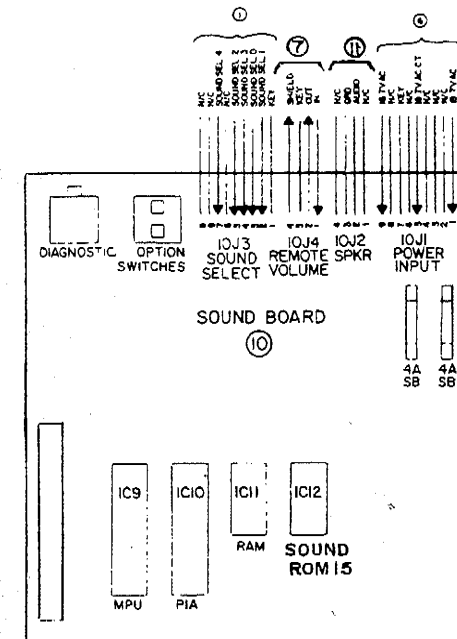
Inspection

- A. Check all connectors in backbox for loose wire termination. Reseat any loose wires by pushing in on terminal.
- B. Push on all connectors attached to Master Display, CPU, Driver, and Sound Boards, and check terminations on capacitor and bridge rectifiers at lower right of backbox.
- C. Gently press on all socketed IC packages on CPU and Sound Boards.
- D. Check that two fuses on Sound Board and seven fuses on Power Supply Board are secure.
- E. Push on connector attached to Slave Display Boards.
- F. Check that line fuse in bottom of cabinet is secure.
- G. Check transformer input connector in bottom of cabinet for loose wire termination. Reseat any loose wires by pushing in on termination.
- H. Check cabinet to coin door connector for loose wire termination. Reseat any loose wires by pushing in on termination.

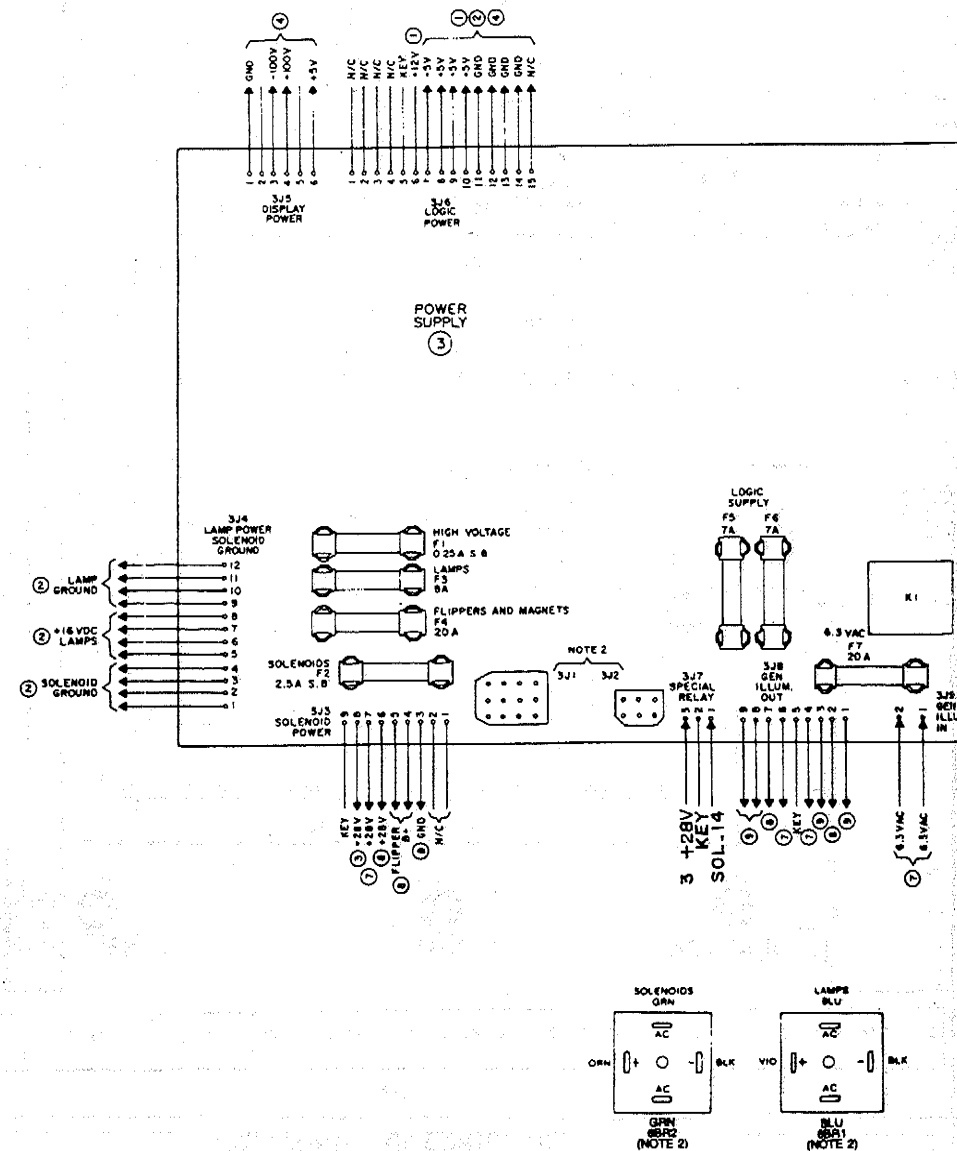
Power Turn-On and Game Setup

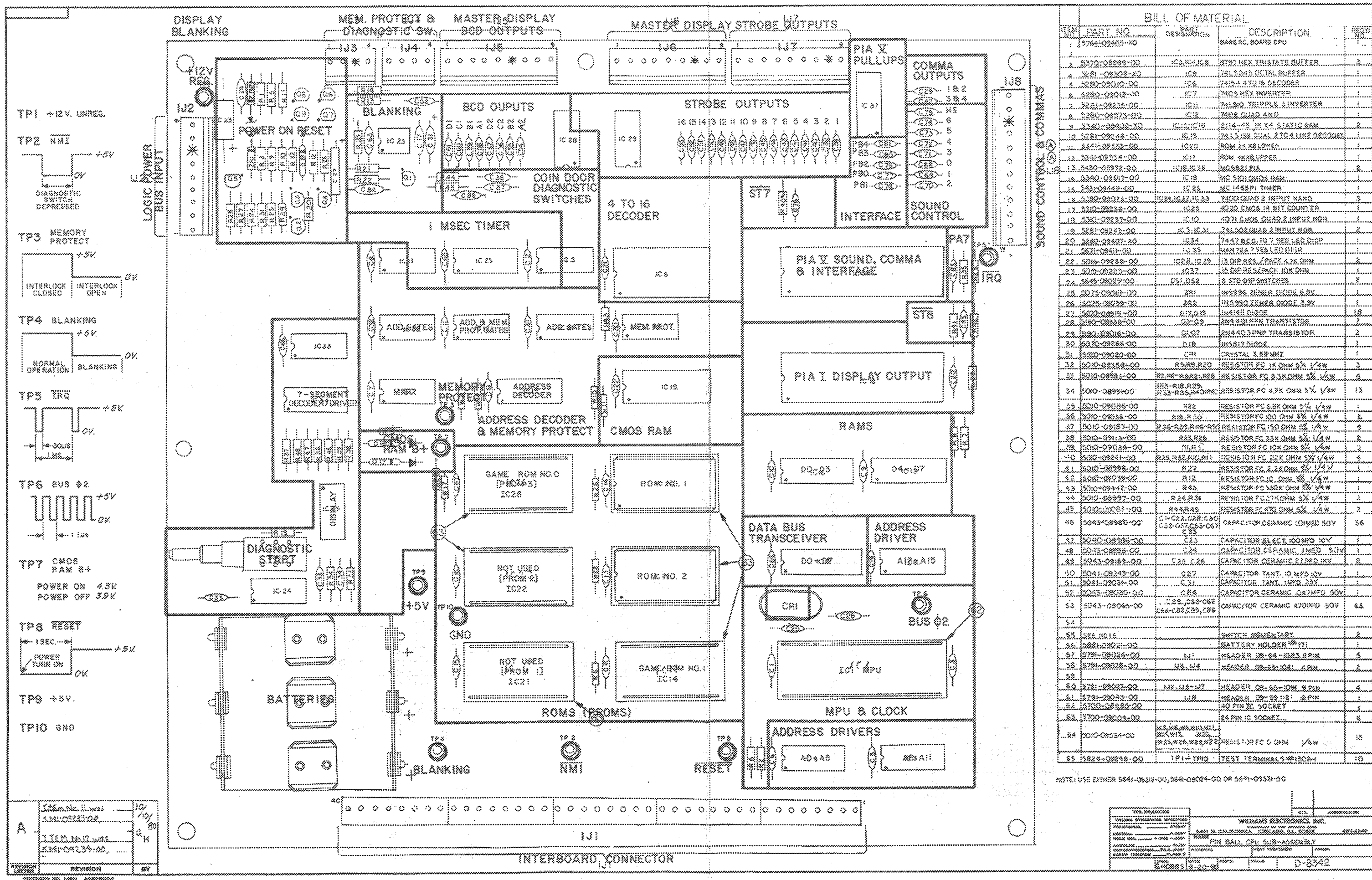
This machine **MUST BE PLUGGED INTO A PROPERLY GROUNDED OUTLET** to PREVENT SHOCK HAZARD and to ensure PROPER GAME OPERATION. DO NOT use a "cheater" plug to defeat the ground pin on line cord, and DO NOT cut off ground pin. Line voltage **MUST** agree with that specified on the back of cabinet or serious damage to machine could occur. For low-line applications (105 or 210V ac), refer to the power wiring diagram.

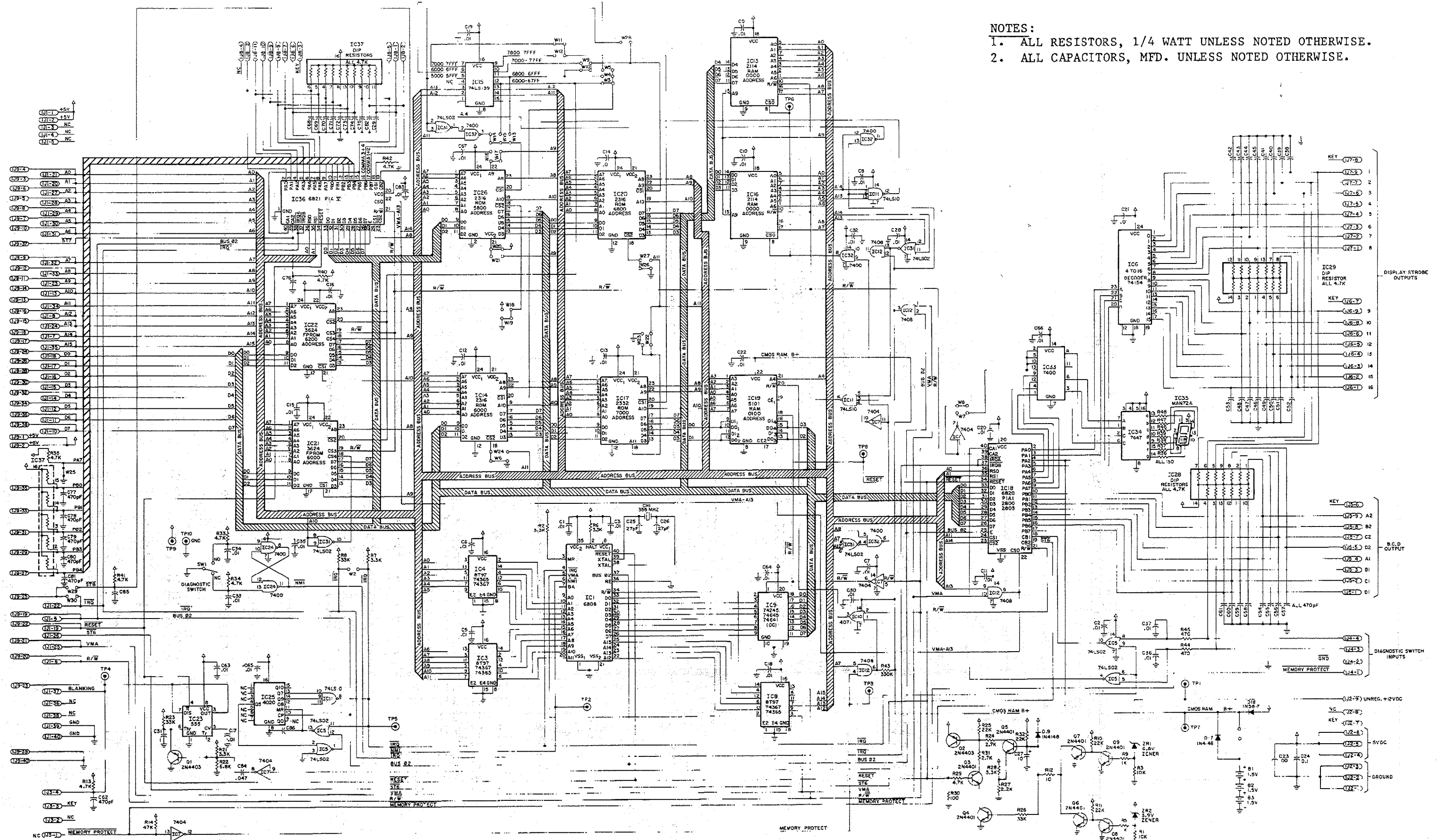
- A. With the coin door closed, plug game in and turn it ON. Game should come on in Game Over mode as indicated by Player 1 score reading zero, Game Over lights lit, and High Score to Date alternating with player scores.
- B. If game comes on in the Diagnostic Mode (Credits display showing 04, Ball in Play Display showing 00, and Player 1 display showing game identification) turn game OFF and ON again.
 1. If game now comes on in Game Over mode, bookkeeping and game evaluation totals have been reset to zero.
 2. If game still comes on in Diagnostic Mode, open coin door and turn game OFF, and ON twice. This is an indication of batteries being removed with power OFF or coming loose during shipment. This has also resulted in features reverting to factory settings. Any changes from factory settings must be re-entered using procedures provided in Instruction booklet.
- C. If game still comes on in Diagnostic Mode, refer to troubleshooting procedures in maintenance manual.
- D. Place three balls on playfield next to outhole.
- E. Perform diagnostic tests and make any desired changes to features as described in Instruction booklet.

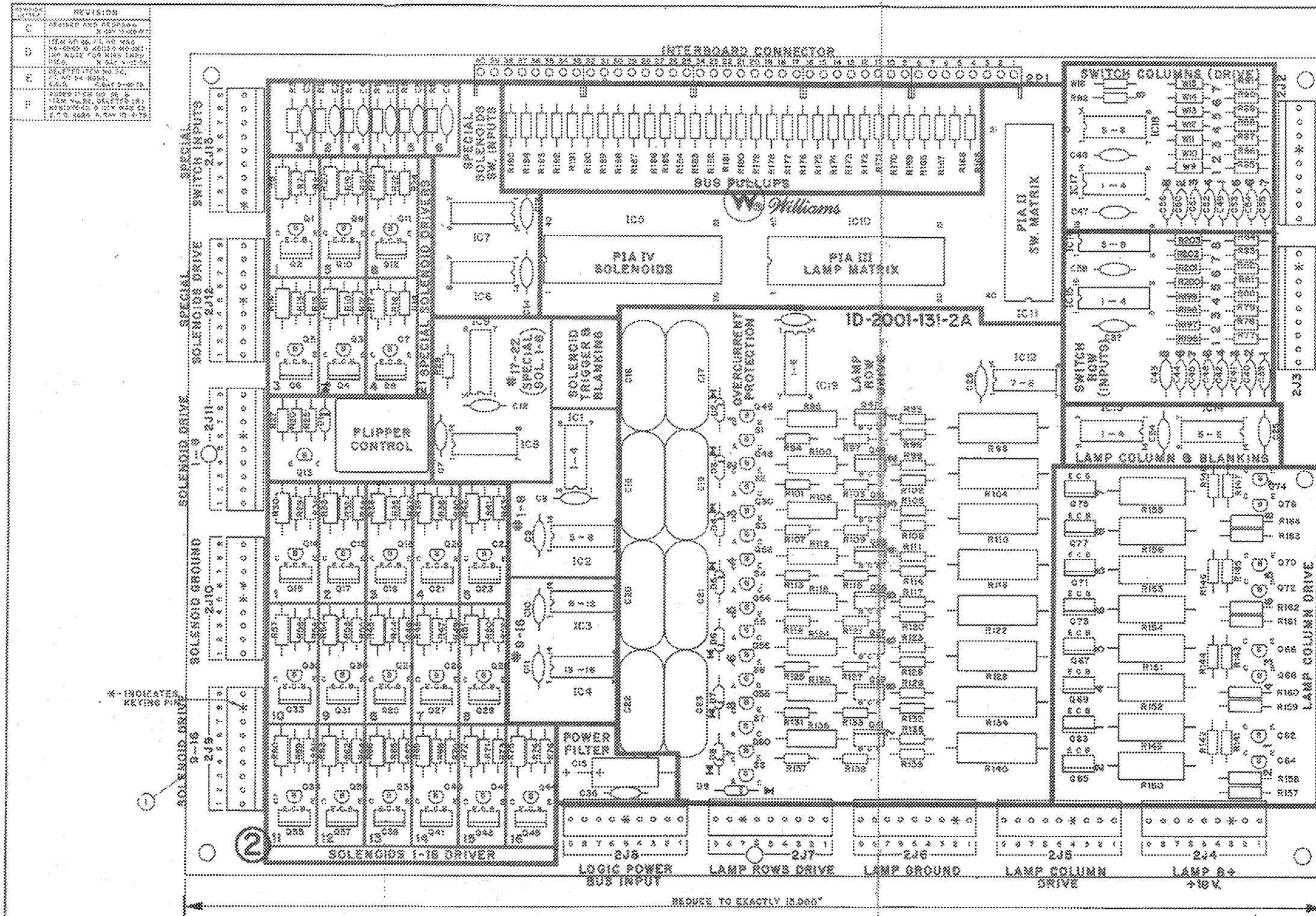


2. REFER TO POWER WIRING DIAGRAM FOR CONNECTIONS TO 3P1.









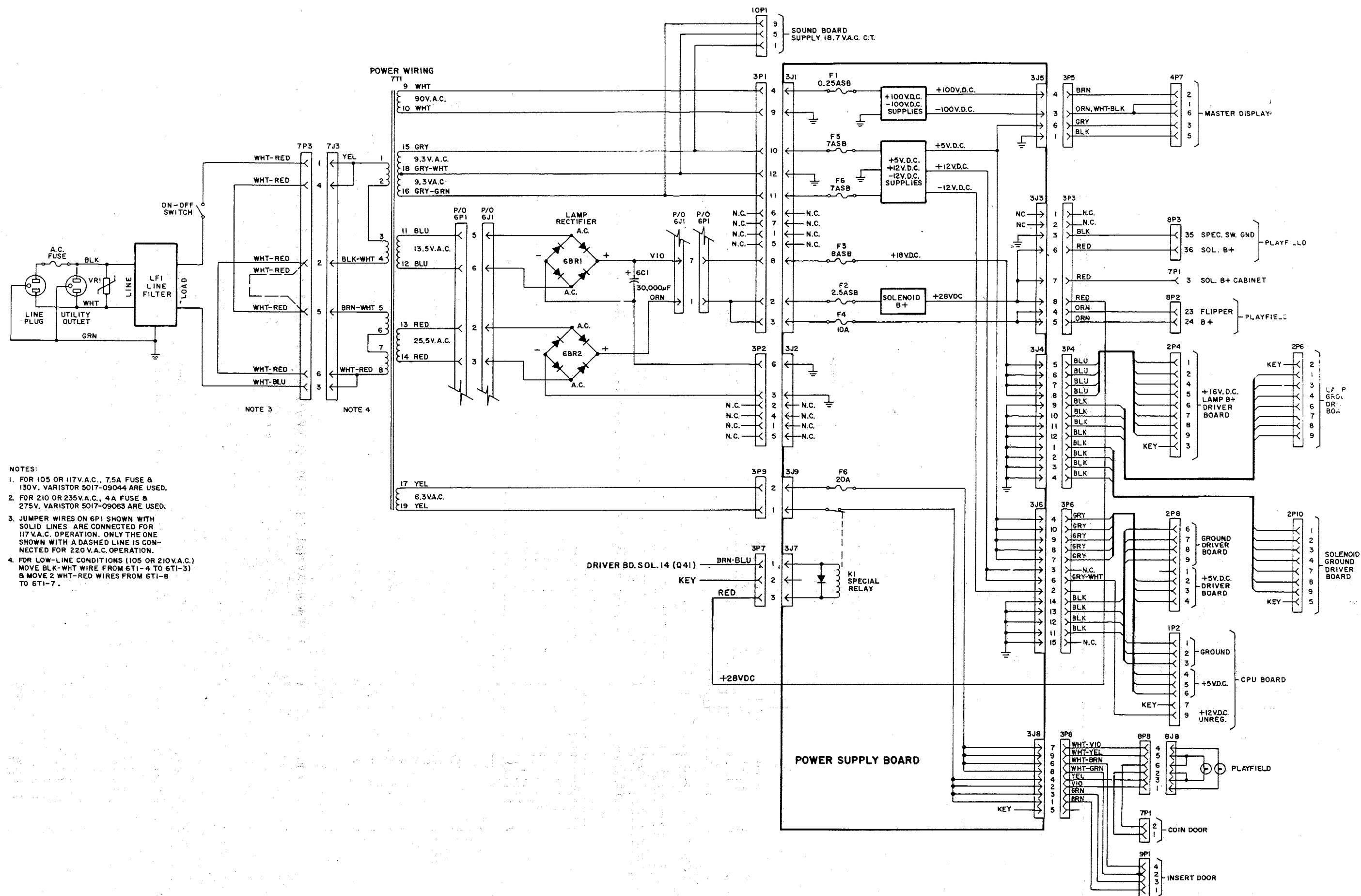
BILL OF MATERIAL				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ. QTY.
1	1A-0011-13		WIRE P.C. BOARD	1
2	3A-0040	IC-1110	74120 QUAD SUPPLY 2 INPUT POSITIVE NON INVER	2
3	3A-0049	10K 1/4W 1% 100K 1/4W	RESISTOR, 10K 1/4W 1% 100K 1/4W	4
4	3A-0073	101 1/4W 1% 10K 1/4W	6700K QUAD SUPPLY 2 INPUT	2
5	3A-0075	100K 1/4W 1%	100K 1/4W 1% 100K 1/4W	2
6	3A-0076	10K 1/4W 1%	100K 1/4W 1% 100K 1/4W	2
7	5A-0006	2N 3638, 2N 3639, 2N 3640, 2N 3641, 2N 3642, 2N 3643, 2N 3644, 2N 3645, 2N 3646, 2N 3647, 2N 3648, 2N 3649, 2N 3650, 2N 3651, 2N 3652, 2N 3653, 2N 3654, 2N 3655, 2N 3656, 2N 3657, 2N 3658, 2N 3659, 2N 3660, 2N 3661, 2N 3662, 2N 3663, 2N 3664, 2N 3665, 2N 3666, 2N 3667, 2N 3668, 2N 3669, 2N 3670, 2N 3671, 2N 3672, 2N 3673, 2N 3674, 2N 3675, 2N 3676, 2N 3677, 2N 3678, 2N 3679, 2N 3680, 2N 3681, 2N 3682, 2N 3683, 2N 3684, 2N 3685, 2N 3686, 2N 3687, 2N 3688, 2N 3689, 2N 3690, 2N 3691, 2N 3692, 2N 3693, 2N 3694, 2N 3695, 2N 3696, 2N 3697, 2N 3698, 2N 3699, 2N 3700, 2N 3701, 2N 3702, 2N 3703, 2N 3704, 2N 3705, 2N 3706, 2N 3707, 2N 3708, 2N 3709, 2N 3710, 2N 3711, 2N 3712, 2N 3713, 2N 3714, 2N 3715, 2N 3716, 2N 3717, 2N 3718, 2N 3719, 2N 3720, 2N 3721, 2N 3722, 2N 3723, 2N 3724, 2N 3725, 2N 3726, 2N 3727, 2N 3728, 2N 3729, 2N 3730, 2N 3731, 2N 3732, 2N 3733, 2N 3734, 2N 3735, 2N 3736, 2N 3737, 2N 3738, 2N 3739, 2N 3740, 2N 3741, 2N 3742, 2N 3743, 2N 3744, 2N 3745, 2N 3746, 2N 3747, 2N 3748, 2N 3749, 2N 3750, 2N 3751, 2N 3752, 2N 3753, 2N 3754, 2N 3755, 2N 3756, 2N 3757, 2N 3758, 2N 3759, 2N 3760, 2N 3761, 2N 3762, 2N 3763, 2N 3764, 2N 3765, 2N 3766, 2N 3767, 2N 3768, 2N 3769, 2N 3770, 2N 3771, 2N 3772, 2N 3773, 2N 3774, 2N 3775, 2N 3776, 2N 3777, 2N 3778, 2N 3779, 2N 3780, 2N 3781, 2N 3782, 2N 3783, 2N 3784, 2N 3785, 2N 3786, 2N 3787, 2N 3788, 2N 3789, 2N 3790, 2N 3791, 2N 3792, 2N 3793, 2N 3794, 2N 3795, 2N 3796, 2N 3797, 2N 3798, 2N 3799, 2N 3800, 2N 3801, 2N 3802, 2N 3803, 2N 3804, 2N 3805, 2N 3806, 2N 3807, 2N 3808, 2N 3809, 2N 3810, 2N 3811, 2N 3812, 2N 3813, 2N 3814, 2N 3815, 2N 3816, 2N 3817, 2N 3818, 2N 3819, 2N 3820, 2N 3821, 2N 3822, 2N 3823, 2N 3824, 2N 3825, 2N 3826, 2N 3827, 2N 3828, 2N 3829, 2N 3830, 2N 3831, 2N 3832, 2N 3833, 2N 3834, 2N 3835, 2N 3836, 2N 3837, 2N 3838, 2N 3839, 2N 3840, 2N 3841, 2N 3842, 2N 3843, 2N 3844, 2N 3845, 2N 3846, 2N 3847, 2N 3848, 2N 3849, 2N 3850, 2N 3851, 2N 3852, 2N 3853, 2N 3854, 2N 3855, 2N 3856, 2N 3857, 2N 3858, 2N 3859, 2N 3860, 2N 3861, 2N 3862, 2N 3863, 2N 3864, 2N 3865, 2N 3866, 2N 3867, 2N 3868, 2N 3869, 2N 3870, 2N 3871, 2N 3872, 2N 3873, 2N 3874, 2N 3875, 2N 3876, 2N 3877, 2N 3878, 2N 3879, 2N 3880, 2N 3881, 2N 3882, 2N 3883, 2N 3884, 2N 3885, 2N 3886, 2N 3887, 2N 3888, 2N 3889, 2N 3890, 2N 3891, 2N 3892, 2N 3893, 2N 3894, 2N 3895, 2N 3896, 2N 3897, 2N 3898, 2N 3899, 2N 3900, 2N 3901, 2N 3902, 2N 3903, 2N 3904, 2N 3905, 2N 3906, 2N 3907, 2N 3908, 2N 3909, 2N 3910, 2N 3911, 2N 3912, 2N 3913, 2N 3914, 2N 3915, 2N 3916, 2N 3917, 2N 3918, 2N 3919, 2N 3920, 2N 3921, 2N 3922, 2N 3923, 2N 3924, 2N 3925, 2N 3926, 2N 3927, 2N 3928, 2N 3929, 2N 3930, 2N 3931, 2N 3932, 2N 3933, 2N 3934, 2N 3935, 2N 3936, 2N 3937, 2N 3938, 2N 3939, 2N 3940, 2N 3941, 2N 3942, 2N 3943, 2N 3944, 2N 3945, 2N 3946, 2N 3947, 2N 3948, 2N 3949, 2N 3950, 2N 3951, 2N 3952, 2N 3953, 2N 3954, 2N 3955, 2N 3956, 2N 3957, 2N 3958, 2N 3959, 2N 3960, 2N 3961, 2N 3962, 2N 3963, 2N 3964, 2N 3965, 2N 3966, 2N 3967, 2N 3968, 2N 3969, 2N 3970, 2N 3971, 2N 3972, 2N 3973, 2N 3974, 2N 3975, 2N 3976, 2N 3977, 2N 3978, 2N 3979, 2N 3980, 2N 3981, 2N 3982, 2N 3983, 2N 3984, 2N 3985, 2N 3986, 2N 3987, 2N 3988, 2N 3989, 2N 3990, 2N 3991, 2N 3992, 2N 3993, 2N 3994, 2N 3995, 2N 3996, 2N 3997, 2N 3998, 2N 3999, 2N 4000, 2N 4001, 2N 4002, 2N 4003, 2N 4004, 2N 4005, 2N 4006, 2N 4007, 2N 4008, 2N 4009, 2N 4010, 2N 4011, 2N 4012, 2N 4013, 2N 4014, 2N 4015, 2N 4016, 2N 4017, 2N 4018, 2N 4019, 2N 4020, 2N 4021, 2N 4022, 2N 4023, 2N 4024, 2N 4025, 2N 4026, 2N 4027, 2N 4028, 2N 4029, 2N 4030,	25	
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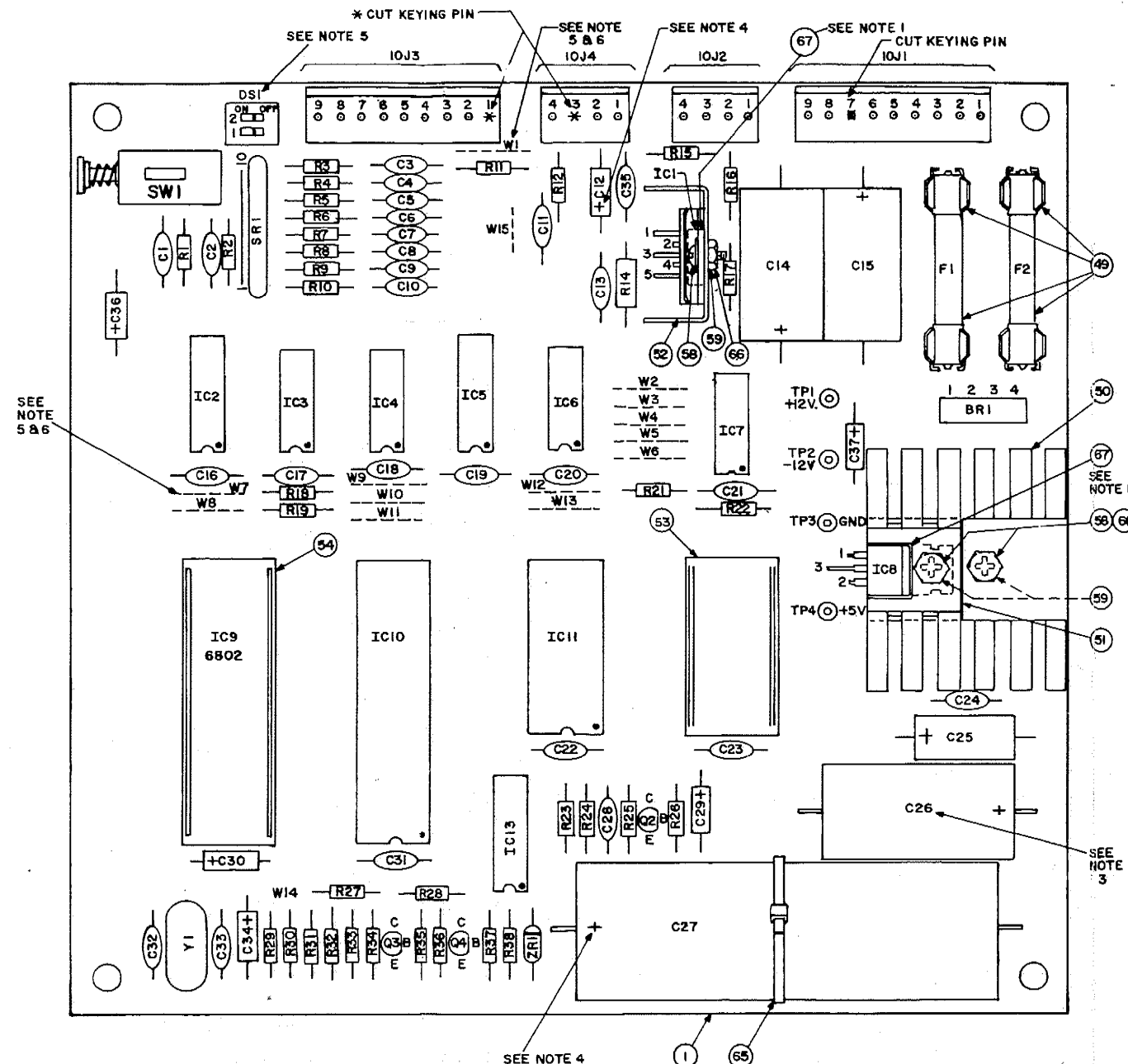
* THIS INFO MUST BE MONITORED
BY THE SURFACE OF BOARD.

WILLIAMS ELECTRONICS, INC.				
SPECIALTY OF VIDEO EQUIPMENT				
2401 N. CALIFORNIA ST. CHICAGO, ILL. 60640				
PART NAME				
DRIVEN BOARD ASSEMBLY				
QTY.	PRICE	AMOUNT	TAXES	TOTAL DUE
1	64.00	64.00	0.00	64.00
				0-7557



Driver Board Logic Diagram
(Sheet 1 of 2) 11/12





BILL OF MATERIAL

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D. NO.
1	01-2 01-145-6		BARE P.C. BOARD REV F	1
2	5370-09156-00	IC1	TDA 2002 V AUDIO AMPLIFIER	1
3	5280-09012-00	IC2	7442 BCD-DEC DECODER	1
4	5280-09013-00	IC3	7400 QUAD 2 INPUT NAND	1
5	5280-08973	IC4	7408 QUAD 2 INP. AND GATE	1
6	5310-09153-00	IC5	4050 BUFFER	1
7	5310-09154-00	IC6	4068 8 INPUT NAND GATE	1
8	5310-08971-00	IC7	4069 HEX INVERTER	1
9	5250-09157-00	IC8	7805 5 VOLT REG. W/TO 220 CASE	1
10	5430-08972-00	IC10	6821 P.I.A.	1
11	5340-09003-00	IC11	6810 RAM	1
12	5371-09152-00	IC13	1408 D/A CONVERTER	1
13	5160-08938-00	Q2, Q3, Q4	2N4401 NPN TRANSISTOR	3
14				
15	5075-09018-00	ZR1	1N5996A 6.8V ZENER DIODE	1
16				
17	5100-09357-00	BR1	MDA 200/3N253	1
18	5100-09158-00		BRIDGE RECTIFIER	1
19	5520-09020-00	Y1	3.58 MHZ CRYSTAL	1
20	5010-08991-00	R1, R18, R19, R21, R22, R27, R30, R31, R32	RESISTOR, FC, 4.7K OHM, 5% 1/4 WATT	9
21	5010-09036-00	R2 thru R10	RESISTOR, FC, 100 OHM, 5% 1/4W	9
22	5010-09358-00	R12, R15, R28, R36, R38	RESISTOR, FC, 1K OHM, 5% 1/4W	5
23	5010-09181-00	R14	RESISTOR, FC, 1 OHM, 10% 1/2 WATT	1
24	5010-09151-00	R16	RESISTOR, FC, 2.2 OHM, 5% 1/4 WATT	1
25	5010-09361-00	R17	RESISTOR, FC, 220 OHM, 5% 1/2 WATT	1
26	5010-08993-00	R23, R24, R25	RESISTOR, FC, 3.3K OHM, 5% 1/4 WATT	3
27	5010-09179-00	R25	RESISTOR, FC, 3.3M OHM, 5% 1/4 WATT	1
28	5010-09035-00	R29	RESISTOR, FC, 47K OHM, 5% 1/4 WATT	1
29	5010-09034-00	R33, R35, R37	RESISTOR, FC, 10K OHM, 5% 1/4 WATT	3
30	5010-09039-00	R34	RESISTOR, FC, 10 OHM, 5% 1/4 WATT	1
31	5043-08980-00	C1, C16 thru C23, C31	CAPACITOR, CER. .01 MFD. 50V. +80%, -20%	10
32	5043-09065-00	C2 thru C10	CAPACITOR, CER. 470 PFD. 50V. +20%	9
33	5043-09345-00	C11	CAPACITOR, CER. .001 MFD. +20% 100V.	1
34	5040-09365-00	C12, C30, C36	CAPACITOR, ELECT. 1 MFD. 63V. -10 +50%	3
35	5043-08996-00	C15, C24, C35	CAPACITOR, CER. .1 MFD. 50V. +20%	3
36	5040-09165-00	C14	CAPACITOR, ELECT. 1,000 MFD. 16V. +20%	1
37	5040-09164-00	C15	CAPACITOR, ELECT. 470 MFD. 10V. +20%	1
38	5040-08986-00	C25	CAPACITOR, ELECT. 100 MFD. 10V. +20%	1
39	5040-08989-00	C26	CAPACITOR, ELECT. 1,000 MFD. 25V. +20%	1
40	5040-09376-00	C27	CAPACITOR, ELECT. 4700 MFD. 16V. +20%	1
41	5043-09180-00	C28	CAPACITOR, CER. 47 PFD. 1K V. +20%	1
42	5040-09343-00	C29	CAPACITOR, ELECT. 10 MFD. 20V	1
43	5043-09169-00	C32, C33	CAPACITOR, CER. DISC, 27 PFD. 1KV. +13%	2
44	5041-09163-00	C34	CAPACITOR, TANTALUM 2.2 MFD. 15V. +20%	1
45	5041-09051-00	C37	CAPACITOR, TANTALUM 1 MFD. 25V. +20%	1
46	5641-09658-00	SW1	MOMENTARY SWITCH SPDT	1
47	5645-09350-00	DS1	2 STD. DIP SWITCH	1
48	5731-06314-00	F1, F2	4 AMP SLOW BLOW FUSE	2
49	5732-09178-00		FUSEHOLDER	2
50	5705-09172-00		HEAT SINK THERMALLOY #6072B	1
51	5705-09173-00		HEAT SINK THERMALLOY #6071B	1
52	5705-09199-00		HEAT SINK THERMALLOY #6030	1
53	5700-09004-00		24 PIN SOCKET	1
54	5700-08985-00		40 PIN SOCKET	1
55	5791-09027-00	10J1, 10J3	9 PIN MALE CONNECTOR 09-65-1091	2
56	5791-09028-00	10J2, 10J4	4 PIN MALE CONNECTOR 09-65-1041	2
57				
58	4006-01003-06		6-32x3/8" P-PH-S	3
59	4406-01117-00		6-32 HEX NUT	3
60	5010-09534-00		0 OHM RESISTOR	A/R
61	5824-09248-00	TP1 THRU TP4	TERMINAL #1502-1	4
62	5010-09363-00	R11	RESISTOR, FC, 5.6K OHM 5% 1/4 WATT	1
63				
64	5019-09362-00	SR1	RESISTOR, 4.7K OHM 10 PIN SIP	1
65	03-7520-1		TIC WRAP	1
66	4703-00007-00		#6 EXT. LOCKWASHER	3
67	20-9229		THERMAL COMPOUND	1

NOTES:

1. USE THERMAL COMPOUND BETWEEN IC1 AND IC8, AND HEAT SINKS.

2. CAUTION: AVOID STATIC DISCHARGE DAMAGE TO MOS LOGIC.

3. SYMBOLS SHOWN ON COMPONENTS ARE FOR REFERENCE ONLY. DO NOT SCREEN OR STAMP.

4. OBSERVE INDEX MARK OF ALL INTEGRATED CIRCUITS:

DIODES D1, D2, AND ZR1;

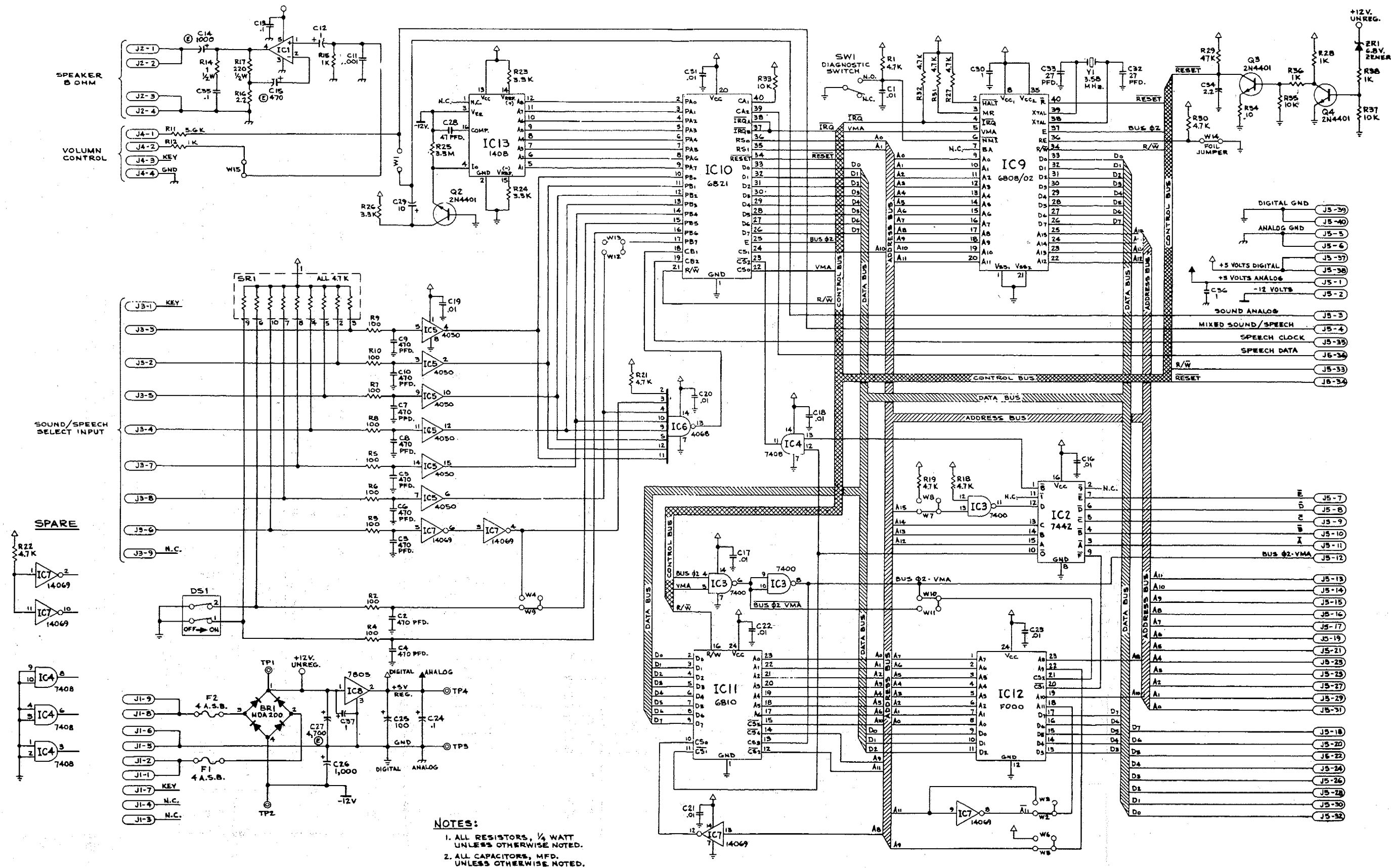
CAPACITORS C12, C14, C15, C25, C26, C27;

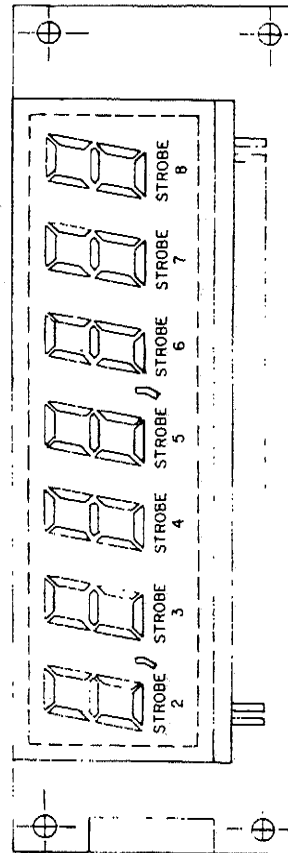
CONNECTORS 10J1, 10J2, 10J3, 10J4, 10J5;

POSITION OF TRANSISTORS Q1, Q2, Q3, Q4.

5. JUMPERS

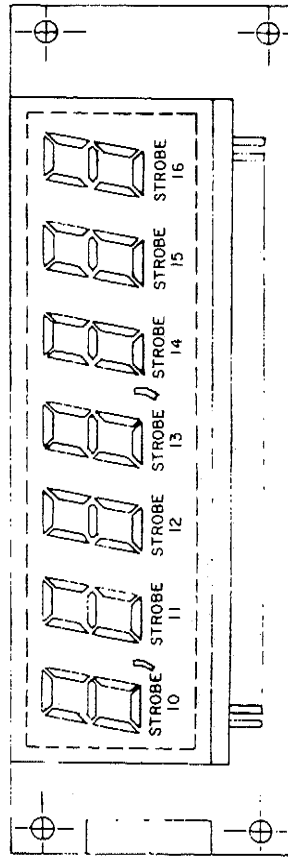
W2) W31
W5) W41
W9) W61
W10) W11 JUT
W12) W12
W13) W13





5J3
5J1

PLAYER #2



5J2
5J4

4J1/5J1 (PLAYER 1)

- | | |
|----|------------------|
| 1 | 100,000's |
| 2 | -100V KEEP ALIVE |
| 3 | 1,000,000's |
| 4 | f SEGMENT |
| 5 | N/C |
| 6 | g SEGMENT |
| 7 | +100V (N/C) |
| 8 | e SEGMENT |
| 9 | 10,000's |
| 10 | d SEGMENT |
| 11 | 1,000's |
| 12 | +100V KEEP ALIVE |
| 13 | 100's |
| 14 | COMMA |
| 15 | 10's |
| 16 | c SEGMENT |
| 17 | N/C |
| 18 | b SEGMENT |
| 19 | UNITS |
| 20 | a SEGMENT |

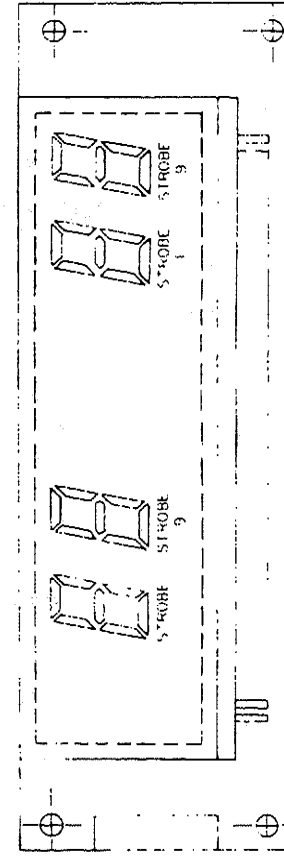
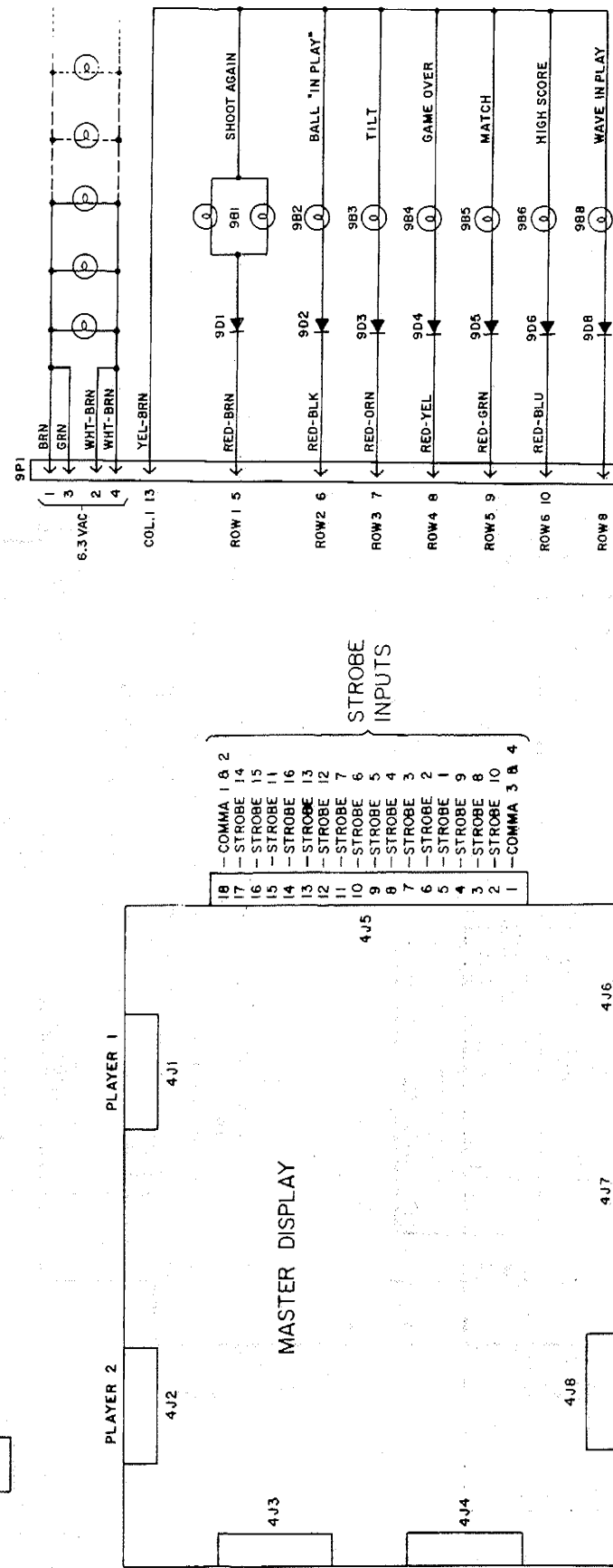
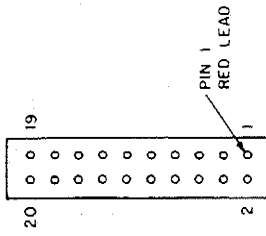
4J2/5J2 (PLAYER 2)

- | | |
|----|------------------|
| 1 | 100,000's |
| 2 | -100V KEEP ALIVE |
| 3 | 1,000,000's |
| 4 | f' SEGMENT |
| 5 | N/C |
| 6 | g' SEGMENT |
| 7 | +100V (N/C) |
| 8 | e' SEGMENT |
| 9 | 10,000's |
| 10 | d' SEGMENT |
| 11 | 1,000's |
| 12 | +100V KEEP ALIVE |
| 13 | 100's |
| 14 | COMMA |
| 15 | 10's |
| 16 | c' SEGMENT |
| 17 | N/C |
| 18 | b' SEGMENT |
| 19 | UNITS |
| 20 | a' SEGMENT |

4J8/5J5 (CREDIT/MATCH)

- | | | | | | | | | |
|---|---------------------|--------|----|------------|-------|-------|------------------|-------|
| 1 | f' Segment (Credit) | Credit | 10 | a' Segment | Match | 15 | +100V Keep Alive | Match |
| 2 | -100V Keep Alive | | 11 | e Segment | | 16 | c Segment | |
| 3 | e' Segment | | 12 | f Segment | | 17 | g Segment | |
| 4 | g' Segment | | 13 | 10's | | 18 | b Segment | |
| 5 | c Segment | | 14 | d Segment | 19 | Units | | |
| 6 | d' Segment | | | | | 20 | a Segment | |
| 7 | b Segment | | | | | | | |
| 8 | 10's | | | | | | | |
| 9 | Units | | | | | | | |

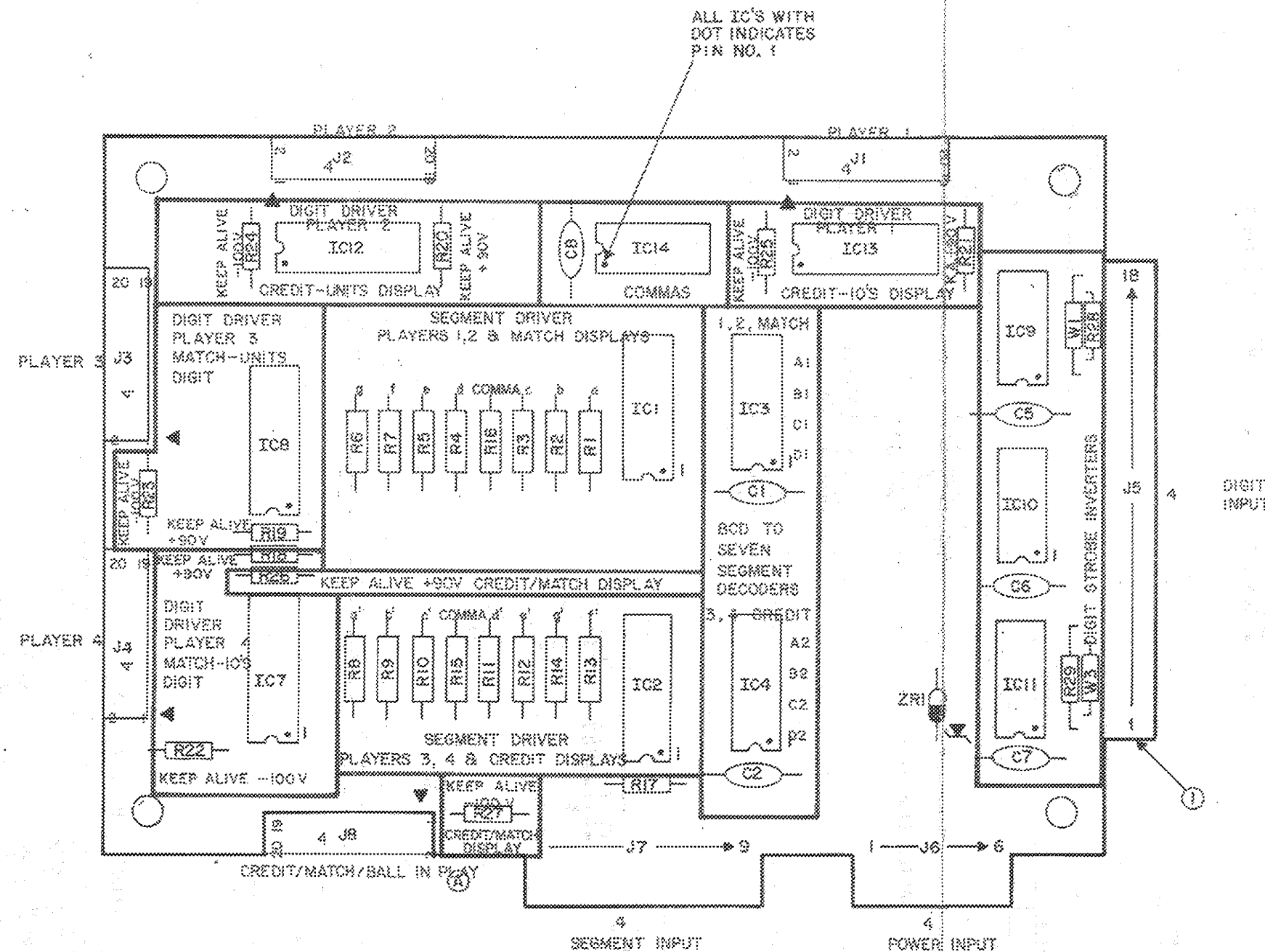
DETAIL A
4J1 - 4J4, 4J8
5J1 - 5J5
CONNECTORS



535

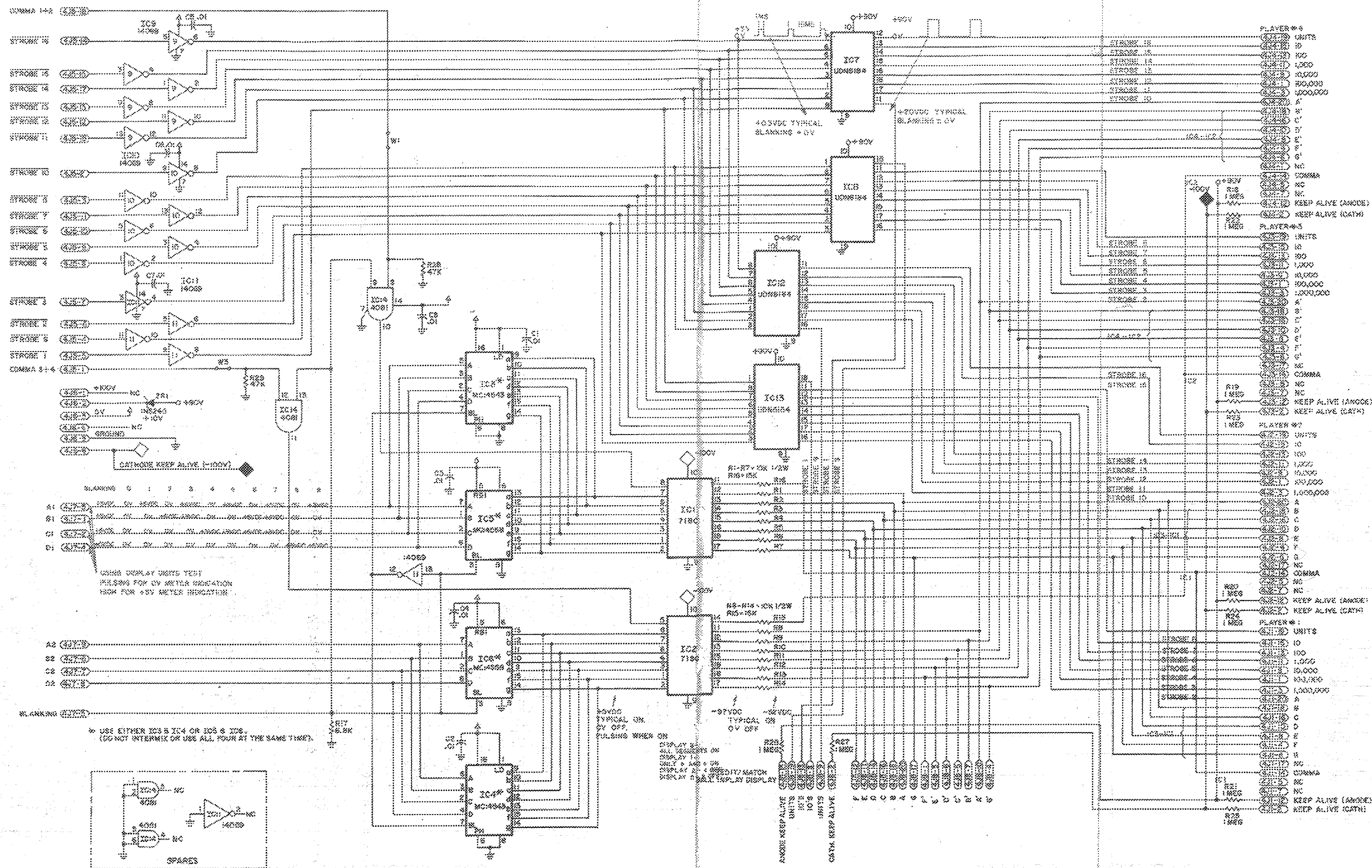
BILL OF MATERIAL

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5750-09461		BASE P.C. BOARD	1
2	5310-08971	IC3, IC10, IC11	MC14069 HEX INVERTER	3
3	5310-08970	IC3, IC4	MC14543 BCD TO SEVEN SEGMENT LATCH/DECODER/DRIVER	2
4	5680-08949	IC1, IC2	MM-7140 GAS DISCHARGE DISPLAY SEGMENT DRIVER	2
5	5680-08948	IC7, IC8, IC12, IC13	MM-6184A OR MM-6118A GAS DISCHARGE DISPLAY SEGMENT DR.	4
6	5310-09450	IC14	MC14081 QUAD 2-INPUT AND GATE	1
7	5010-08981	R1-R14	RESISTOR, FC, 10K OHM, 5%, 1/2 WATT	14
8	5075-09135	XX1	1N4740A ZENER DIODE 10V, 5%, 1 WATT	1
9	5041-08980	C1, C2 C3 THRU C8	CAPACITOR, CERAMIC, 0.01 MFD., 50V, +80 -30%	6
10	5010-09035	R28, R29	RESISTOR, FC, 47K OHM, 5%, 1/4 WATT	2
11	5010-09085	R17	RESISTOR, FC, 6.8K OHM, 5%, 1/4 WATT	1
12	5010-08982	R18 THRU R27	RESISTOR, FC, 5 NEG. OHM, 5%, 1/4 WATT	10
13	5791-09437	J1 THRU J4, J8	20 PIN DINOR HEADER	5
14	5010-09149	R15, R16	RESISTOR, FC, 15K OHM, 5%, 1/2 WATT	2
15	5010-09534	W1, W3	RESISTOR, 0 OHM	2



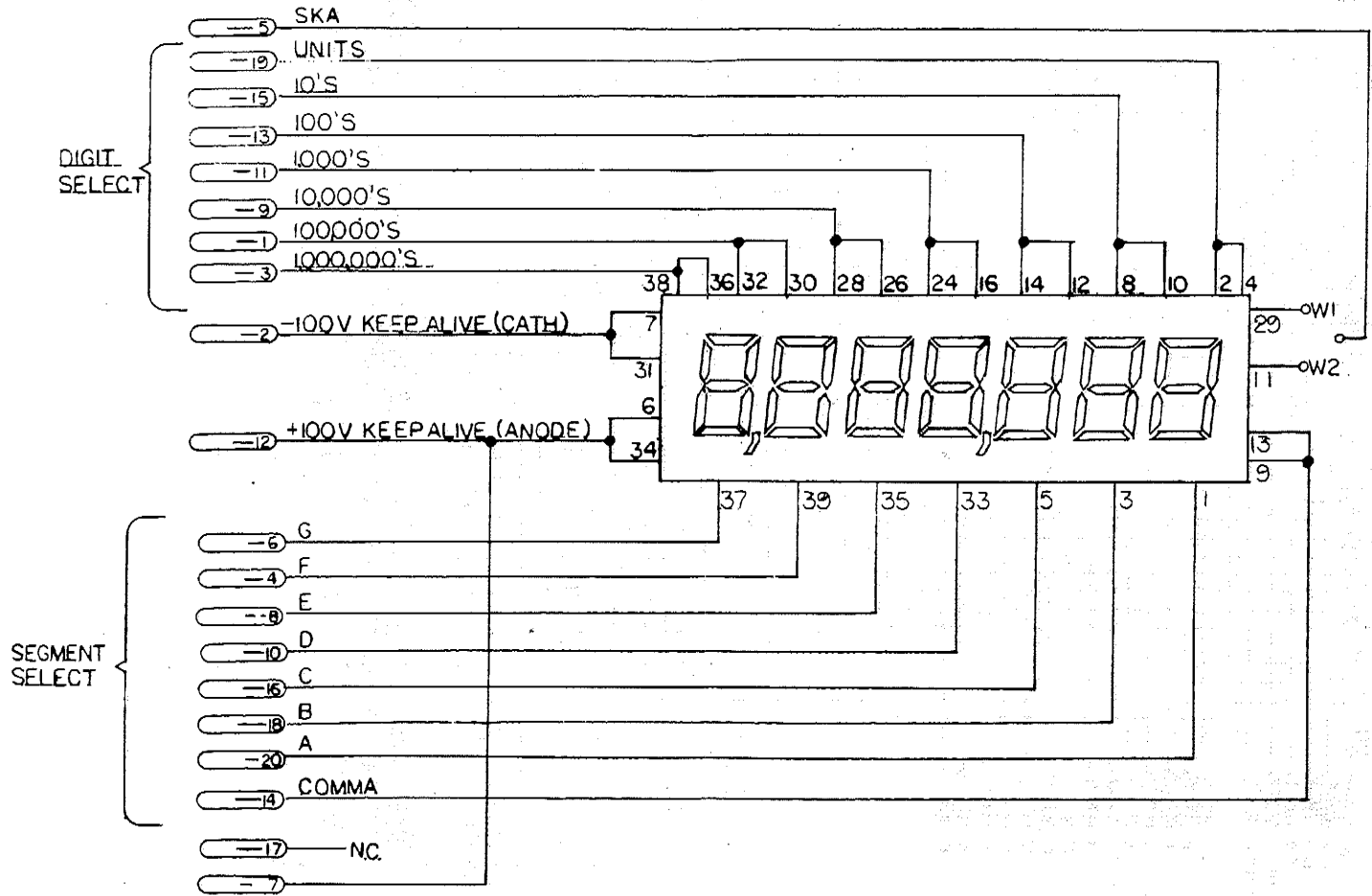
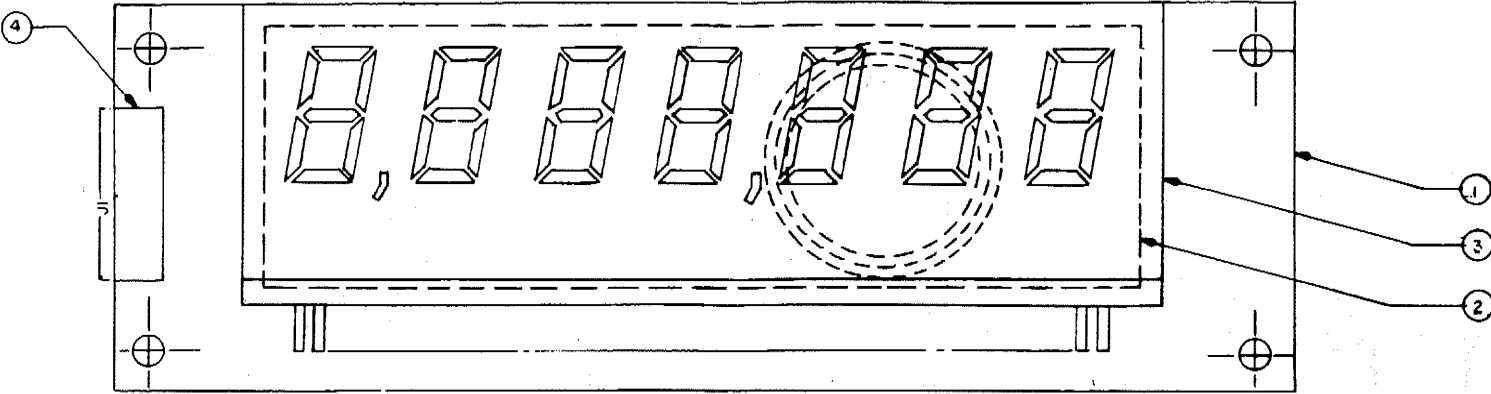
DIGIT CROSS REFERENCE

DIGIT	7-SEGMENT DECODER/DRIVER	STROBE DRIVER
0 (0000)	IC9/IC1	1 (IC13)
1 (0001)	IC9/IC1	2 (IC12)
2 (0010)	IC9/IC1	3 (IC7)
3 (0011)	IC9/IC1	4 (IC8)
4 (0100)	IC9/IC1	5 (IC13)
5 (0101)	IC9/IC1	6 (IC12)
6 (0110)	IC9/IC1	7 (IC13)
7 (0111)	IC9/IC1	8 (IC12)
8 (1000)	IC9/IC1	9 (IC13)
9 (1001)	IC9/IC1	10 (IC12)
10 (1010)	IC9/IC1	11 (IC13)
11 (1011)	IC9/IC1	12 (IC12)
12 (1100)	IC9/IC1	13 (IC13)
13 (1101)	IC9/IC1	14 (IC12)
14 (1110)	IC9/IC1	15 (IC13)
15 (1111)	IC9/IC1	16 (IC12)
16 (1000)	IC9/IC1	17 (IC13)
17 (1001)	IC9/IC1	18 (IC12)
18 (1010)	IC9/IC1	19 (IC13)
19 (1011)	IC9/IC1	20 (IC12)
20 (1100)	IC9/IC1	21 (IC13)
21 (1101)	IC9/IC1	22 (IC12)
22 (1110)	IC9/IC1	23 (IC13)
23 (1111)	IC9/IC1	24 (IC12)
24 (1000)	IC9/IC1	25 (IC13)
25 (1001)	IC9/IC1	26 (IC12)
26 (1010)	IC9/IC1	27 (IC13)
27 (1011)	IC9/IC1	28 (IC12)
28 (1100)	IC9/IC1	29 (IC13)
29 (1101)	IC9/IC1	30 (IC12)
30 (1110)	IC9/IC1	31 (IC13)
31 (1111)	IC9/IC1	32 (IC12)



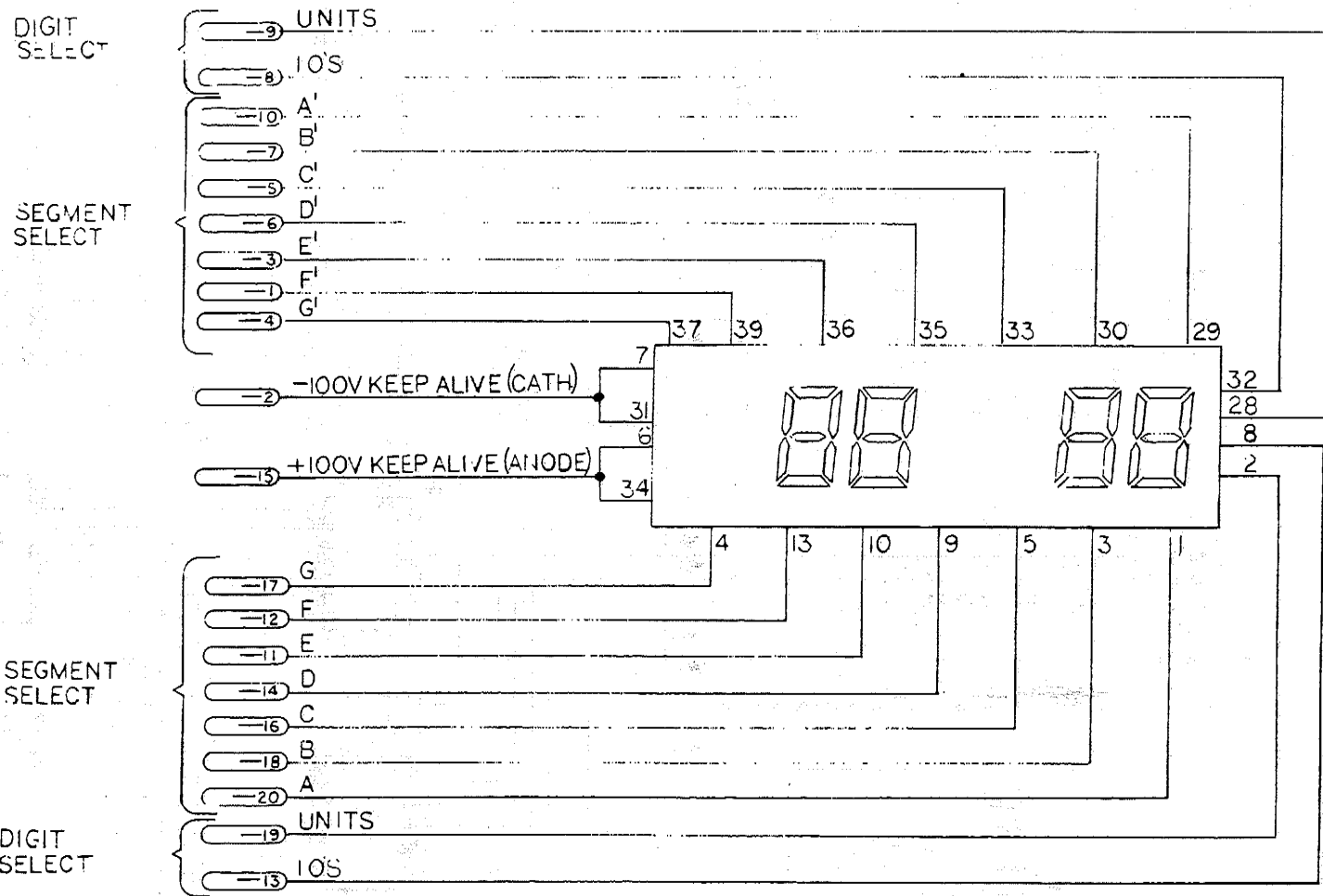
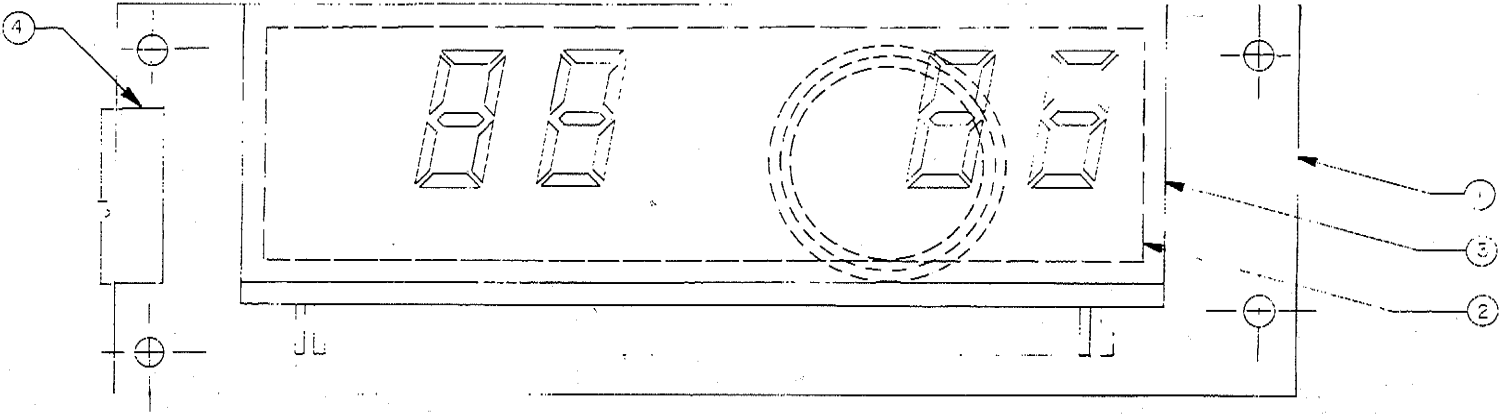
C 8363 Master Display Board Logic Diagram 21

BILL OF MATERIAL				
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D
1	5161-0844B-XP		SLAVE DISPLAY P.C. BOARD	1
2	23-6545		DISPLAY MTG ADHESIVE FOAM	1
3	5670-0544B-XP		7 DIGIT DISPLAY	1
4	5781-0541B-XP	J1	20 PIN RIBBON HEADER	1
5	03-1513-2		CAPLUG	1

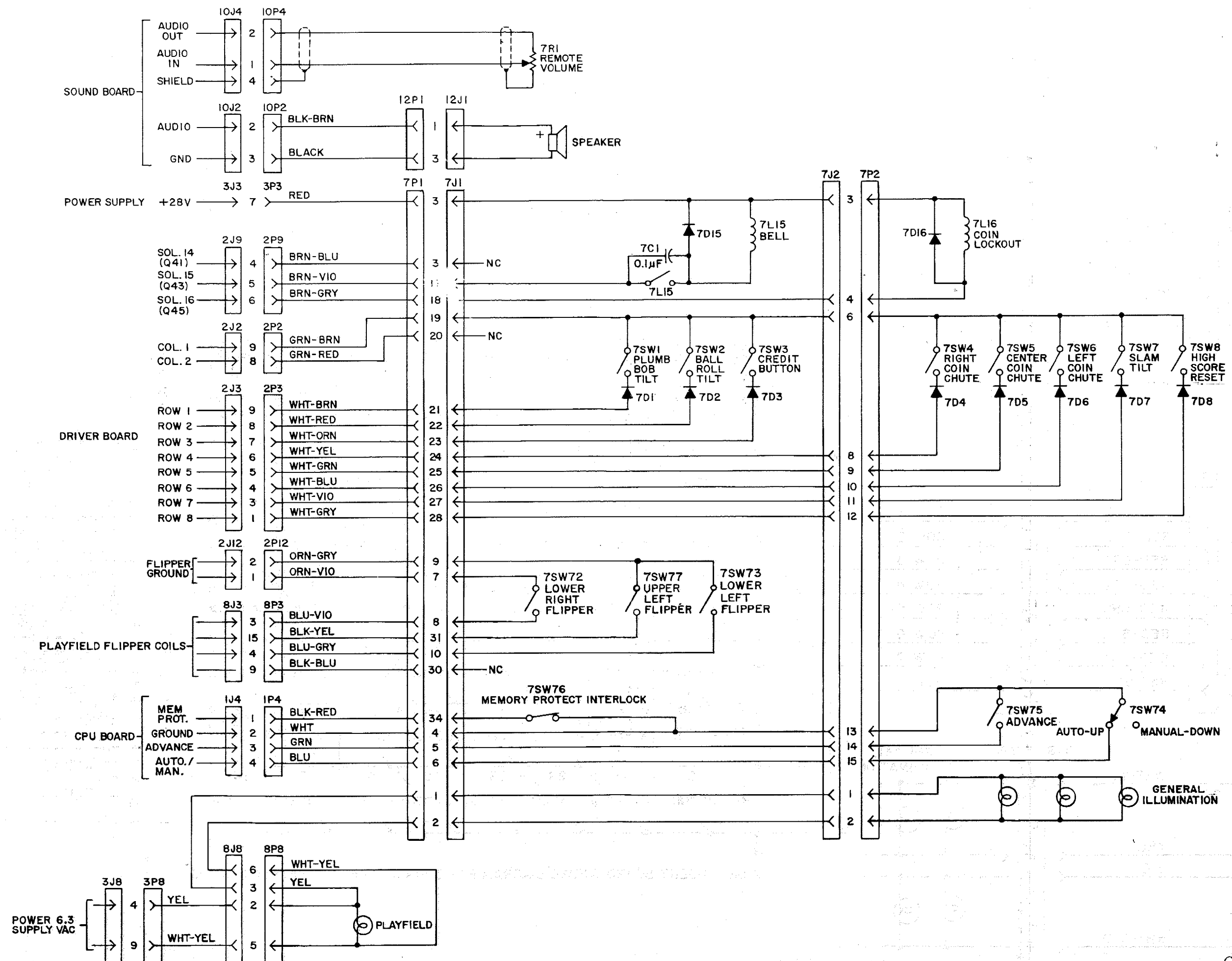


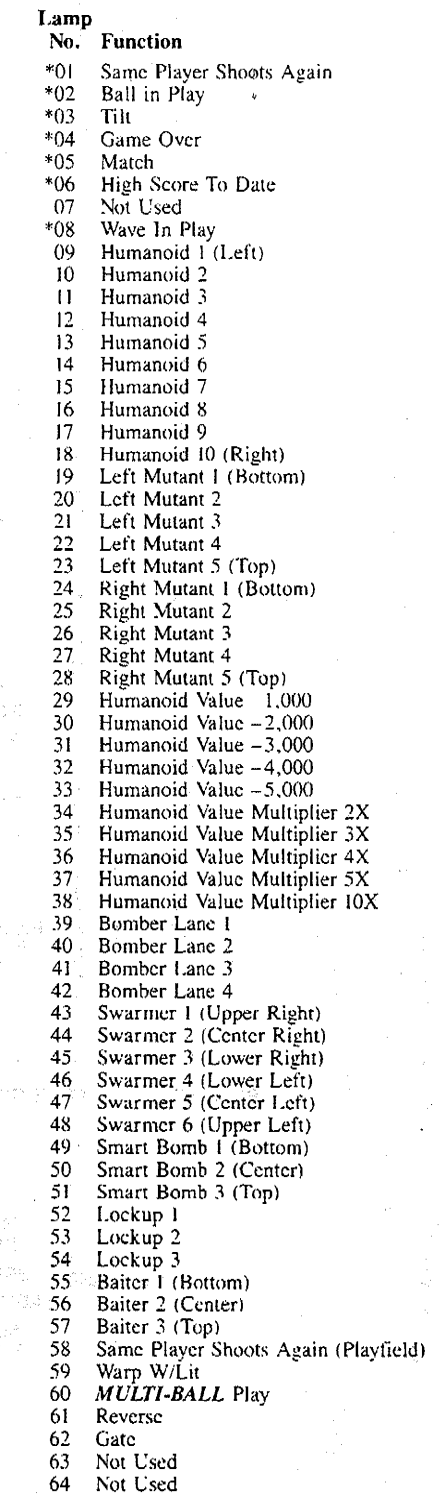
C 8364 PLAYER SLAVE DISPLAY

BILL OF MATERIAL				
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D
1	5161-0544B-00		CREDIT/MATCH SLAVE P.C. BOARD	1
2	23-6545		FOAM DISPLAY - BACK	1
3	5670-0544B-00		4 DIGIT DISPLAY	1
4	5781-0541B-00	J1	20 PIN RIBBON HEADER	1
5	23-6546		FOAM DISPLAY - FRONT	1
6	03-1513-2		CAPLUG	1

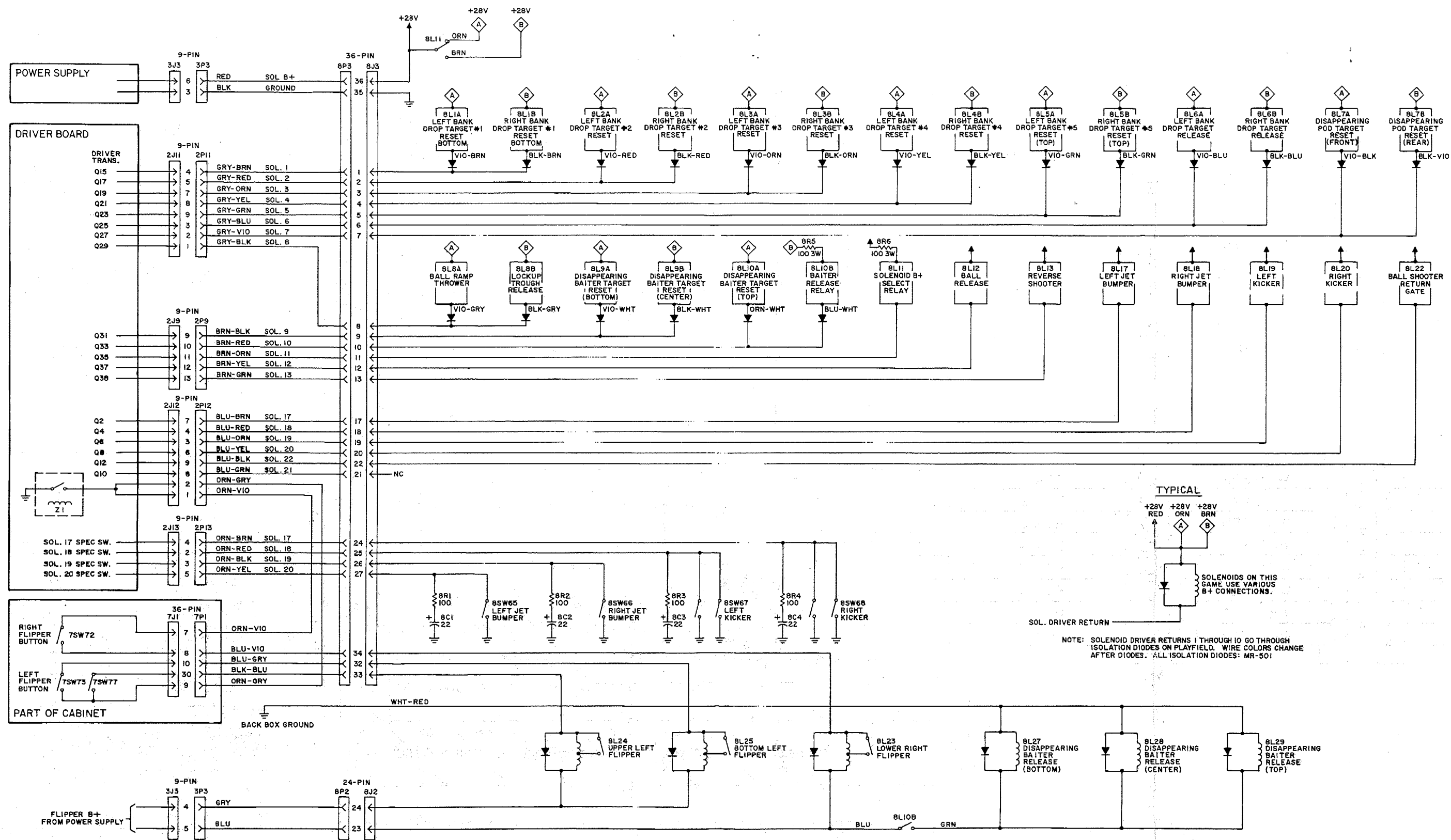


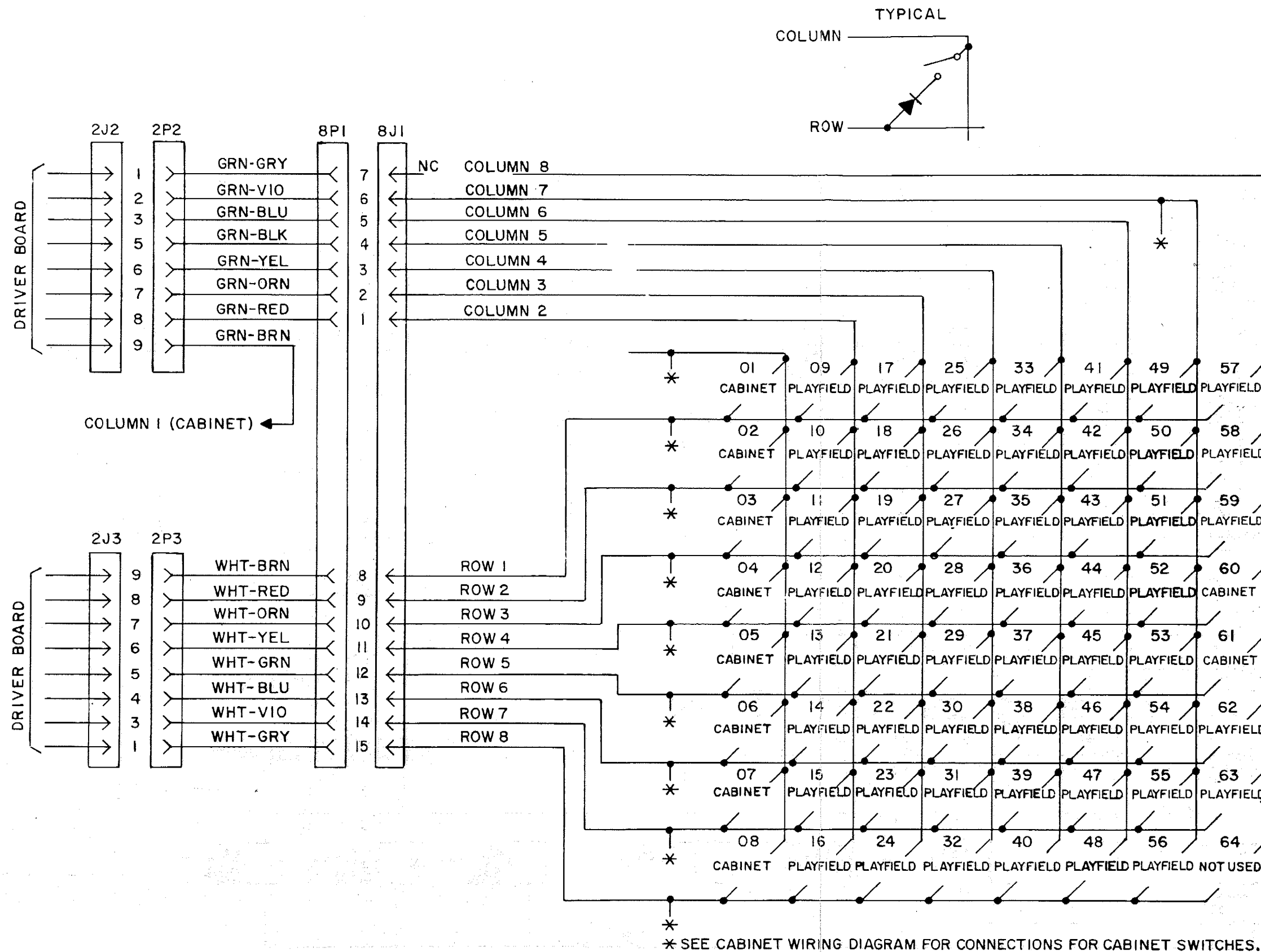
C 8365 CREDIT/MATCH SLAVE DISPLAY





*Lamps 1 through 8 are located in Backbox.





Switch

No. Function (Score*)

- **01 Plumb Bob Tilt
- **02 Ball Roll Tilt
- **03 Credit Button
- **04 Right Coin
- **05 Center Coin
- **06 Left Coin
- **07 Slam Tilt
- **08 High Score Reset
- 09 Bomber Lane 1 Rollover (1,000/3,000)
- 10 Bomber Lane 2 Rollover (1,000/3,000)
- 11 Bomber Lane 3 Rollover (1,000/3,000)
- 12 Bomber Lane 4 Rollover (1,000/3,000)
- 13 Left Lander Drop Target 1 (Bottom) (500/5,000)
- 14 Left Lander Drop Target 2 (500/5,000)
- 15 Left Lander Drop Target 3 (500/5,000)
- 16 Left Lander Drop Target 4 (500/5,000)
- 17 Left Lander Drop Target 5 (Top) (500/5,000)
- 18 Left Mutant Bull's Eye Target 1 (Bottom) (10/2,000)
- 19 Left Mutant Bull's Eye Target 2 (10/2,000)
- 20 Left Mutant Bull's Eye Target 3 (10/2,000)
- 21 Left Mutant Bull's Eye Target 4 (10/2,000)
- 22 Left Mutant Bull's Eye Target 5 (Top) (10/2,000)
- **23 Right Lander Drop Target 1 (Bottom) (500/5,000)
- **24 Right Lander Drop Target 2 (500/5,000)
- **25 Right Lander Drop Target 3 (500/5,000)
- **26 Right Lander Drop Target 4 (500/5,000)
- **27 Right Lander Drop Target 5 (Top) (500/5,000)
- 28 Right Mutant Bull's Eye Target 1 (Bottom) (10/2,000)
- 29 Right Mutant Bull's Eye Target 2 (10/2,000)
- 30 Right Mutant Bull's Eye Target 3 (10/2,000)
- 31 Right Mutant Bull's Eye Target 4 (10/2,000)
- 32 Right Mutant Bull's Eye Target 5 (Top) (10/2,000)
- 33 Disappearing Baiter Target (Bottom) (3,000)
- 34 Disappearing Baiter Target (Center) (3,000)
- 35 Disappearing Baiter Target (Top) (3,000)
- 36 Swarmer Bull's Eye Target (Top) (10/3,000)
- 37 Swarmer Bull's Eye Target (Bottom) (10/3,000)
- 38 Swarmer Standup (10/3,000)
- 39 Disappearing Pod Target (Bottom) (10,000)
- 40 Disappearing Pod Target (Top) (10,000)
- 41 Pod Bull's Eye Target (10,000)
- 42 Lockup Trough (Bottom)
- 43 Lockup Trough (Center)
- 44 Lockup Trough (Top)
- 45 Lockup Trough Rollover
- 46 Outhole
- 47 Ball Ramp (Right)
- 48 Ball Ramp (Center)
- 49 Ball Ramp (Left)
- 50 Ball Shooter Trough
- 51 Left Outlane (5,000)
- 52 Right Outlane (5,000)
- 53 Left Flipper Return Lane (3,000)
- 54 Right Flipper Return Lane (3,000)
- 55 Left Jet Bumper (1,000)
- 56 Right Jet Bumper (1,000)
- 57 Left Kicker (10)
- 58 Right Kicker (10)
- 59 Flipper Lane Change Switch
- **60 Smart Bomb
- **61 Reverse
- 62 Not Used
- 63 Playfield Tilt
- 64 Not Used

NOTES:

*Second Value when lit or flashing

**Switches 1 through 8 and 60 and 61 are located in cabinet.