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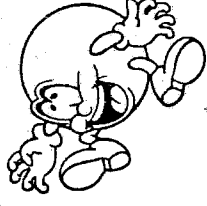


SMART
INDUSTRIES CORP., MFG.

SMART™ BALL



SKILL ALLEY



MANUAL



SMART
INDUSTRIES CORP., MFG.

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TABLE OF CONTENTS

<u>GAME ASSEMBLY</u>	
INSPECTION	1
ASSEMBLY KIT PARTS LIST AND TOOLS	2
WARNING: LOCATION FOR GAME PLACEMENT	3
ASSEMBLY INSTRUCTIONS	4
ASSEMBLY: PICTORIAL #1	5
ASSEMBLY: PICTORIAL #2	6
SIDE NET ASSEMBLY PICTORIAL	7
FRONT NET OPTION PICTORIAL	8
DIMENSIONAL DRAWING	9
BOTTOM COVERS	10
<u>GAME INSTRUCTION</u>	
1. GAME RULES AND OPERATION	11 - 13
1.1 GAME PLAY INSTRUCTIONS	14 - 16
1.2 GAME OPERATION	17 - 18
1.21 CIRCUIT BOARDS	19
1.22 SMARTBALL ROM SPECIFICATIONS	19
1.23 FUSE LIST	
2. GAME BOOKKEEPING FUNCTIONS	20
2.1 AUDIT INFORMATION	21 - 22
2.11 AUDIT RECORDS	23
2.12 PRINTING AUDIT RECORDS	
3. GAME CONFIGURATION	24 - 26
3.1 GAME SETTINGS - AUDIT MODE	27
3.2 GAME SETTINGS - DIP SWITCHES	
4. DIAGNOSTICS AND TROUBLESHOOTING	28
4.1 DIAGNOSTICS MODE	29
4.2 TROUBLESHOOTING	
<u>BOARD SCHEMATICS</u>	
CPU BOARD LAYOUT (#5306)	30
CPU BOARD SCHEMATIC (#5306)	31 - 33
DRIVER I/O BOARD LAYOUT (#5240)	34
DRIVER I/O BOARD SCHEMATIC (#5240)	35 - 36
POWER SUPPLY BOARD LAYOUT (#5241)	37
POWER SUPPLY BOARD SCHEMATIC (#5241)	38
INFRARED BOARD LAYOUT (#5258)	39
INFRARED BOARD SCHEMATIC (#5258)	40
GAS PLASMA DISPLAY BOARD LAYOUT (#5119)	41
GAS PLASMA DISPLAY BOARD SCHEMATIC (#5119)	42
COMPONENT BOARD LAYOUT (#5328)	43
DISPLAY ASSEMBLY (#5319)	44 - 45
BLOCK WIRING DIAGRAM	46
BALL RELEASE ASSEMBLY & PARTS LIST	47
TM - 4 TICKET DISPENSER SCHEMATIC	48
TM - 4 TICKET DISPENSER LOADING INSTRUCTIONS	49
MASTER PARTS LIST	50
<u>SUPPLEMENTAL</u>	
MANUAL BALL RELEASE FEATURE	51
INSTALLATION OF MARQUEE DISPLAY	52 - 55

INSPECTION

WARNING: SHOCK HAZARD

Connect this game only to a grounded 3 wire outlet. If there is only a 2 wire outlet available, it is highly recommended to have a grounded outlet installed.

Players may receive an electrical shock if the game is not properly grounded!

GAME INSPECTION:

Your careful inspection is needed to supply the final touch of quality control. Please follow these instructions to help us ensure that your new game was delivered to you in good condition.

DO NOT PLUG IN AT THIS TIME

1. Examine the exterior of the scoring cabinet and playfield for dents, chips or broken parts.
2. Remove the plastic marquee from the front of the scoring cabinet. Place the marquee in a safe location as it will not be reinstalled until game assembly is completed. Inspect the interior of the scoring cabinet for damage and/or loose parts. Perform visual inspection for loose wires and check all connectors to assure firm seating. Make sure all light bulbs are screwed in tightly.

POWER REQUIREMENTS

Domestic
Foreign
Consumption
Main fuse
Step down transformer (Foreign)

120 VAC @ 60 Hz
200 to 240 VAC @ 50 Hz
Not to exceed .35 KVA
5 Ampere
.5 KVA with 3 Ampere slow blow fuse

ASSEMBLY KIT PARTS LIST AND TOOL REQUIREMENTS

The following items are contained in the bolt bag recieved with your SMART BALL GAME:

2	1/2"-13 x 3" Hex head machine bolts
2	1/2" Split lock washers
2	1/2"-13 Hex nuts
4	5/16"-18 x 2 1/2" Carriage bolts
4	5/16" Split lock washers
4	5/16"-18 Hex nuts
6	#8 x 3/4" Particle board screws

Recommended tools for the assembly of your SMART BALL GAME:

1	3/4" Box end wrench
1	#2 Phillips screw driver
1	1/2" Drive ratchet wrench with 1/2" and 3/4" sockets

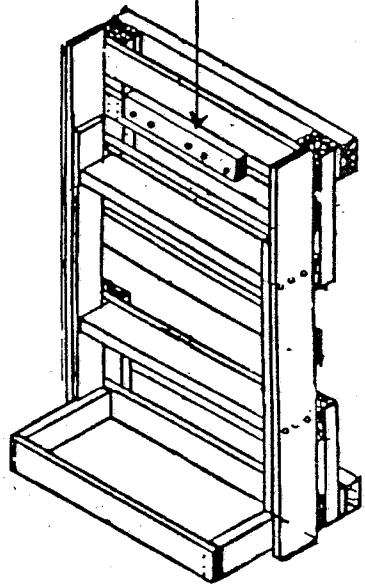
WARNING:

PLEASE USE CAUTION AND GOOD JUDGEMENT WHEN SELECTING A LOCATION FOR PLACEMENT OF THIS GAME, TO AVOID POSSIBLE INJURY TO A PATRON.

ASSEMBLY INSTRUCTIONS

1. Move the control console cabinet to the desired location, uncrate and position with the back of the cabinet facing down (Figure 2). Insert the 1 1/4" square legs through the holes provided in the floor at the rear of the control console and fasten with the 5/16"-18 x 2 1/2" carriage bolts. Install the bolts from the outside, positioning the nuts on the inside of the cabinet. Tighten the bolts very securely.
2. The alley shipping skid has been designed to perform as an assembly fixture. Move the alley into position approximately five feet in front of the control console cabinet (Figure 2). Remove the plastic wrap, all upright supports, the side crating and the top crating from the alley shipping skid. Unload all items placed on the alley for transit.
IMPORTANT: Beneath the front end of the alley, centered between the two front alley supports, a 2 x 4 has been nailed to the skid. Pry the 2 x 4 from the skid and remove the steel banding straps that secure the rear end of the alley to the skid (Figure 1).

Slide the alley forward, approximately 1 1/2 inches, until half of the rear alley support is exposed. Rotate the control console cabinet toward the alley and place the front edge on the exposed area of the rear alley support (Figure 3). Join the control console cabinet to the alley using two 1/2"-13 x 3" machine bolts (Figure 4). **THE BOTTOM EDGE OF THE ALLEY MUST BE FLUSH WITH THE BOTTOM EDGE OF THE CABINET.**
3. Three harness connections are required to make the game operational. The Ball Count Switch connection utilizes a 3 pin molex connector located beneath the playing field on the right side of the control console. There are also harnesses routed down each side of the alley. The signal harness is on the left while the AC power harness is on the right. For shipping purposes, the mates of these harnesses are restrained in the lower portion of the control console with wire ties. Remove the wire ties and dress both harnesses through the holes provided in the control console and alley face plates. Join the connections of both harnesses approximately 18 inches from the alley face plate.
4. Install the side net frames to the control console using the three #8 x 3/4" particle board screws. A front net option is also available. If the option is included with the game, simply snap the plexiglass cover onto the clips which are mounted on the side nets.
5. Plug the game into the power line source and turn on the power switch which is located in the upper left portion of the control console. Reinstall the plastic marque.



Remove 2" x 4"

Figure 1

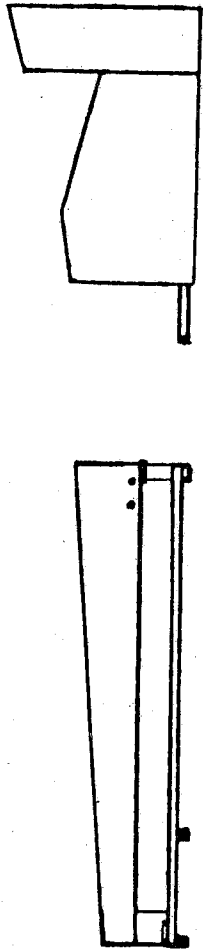


Figure 2

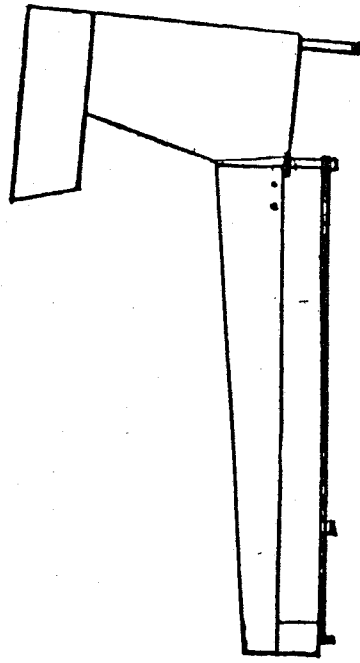


Figure 3

1) Bottom edge of cabinet must be flush with bottom edge of alley.

2) If there is difficulty inserting the 1/2"-13 x 3" hex bolts through the holes in the alley and cabinet support brackets, loosen the nuts marked (A). Insert 1/2" bolt, tighten bolts marked (A) and then tighten 1/2" bolts.

NOTE:

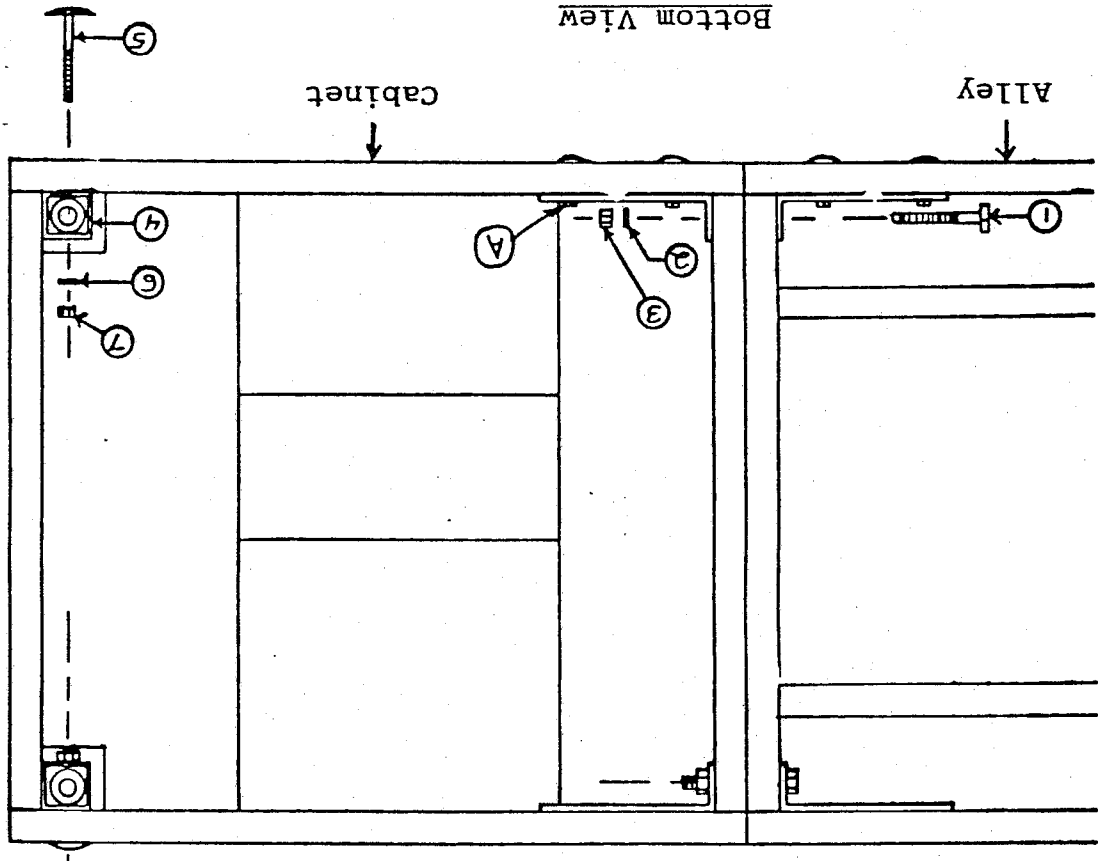
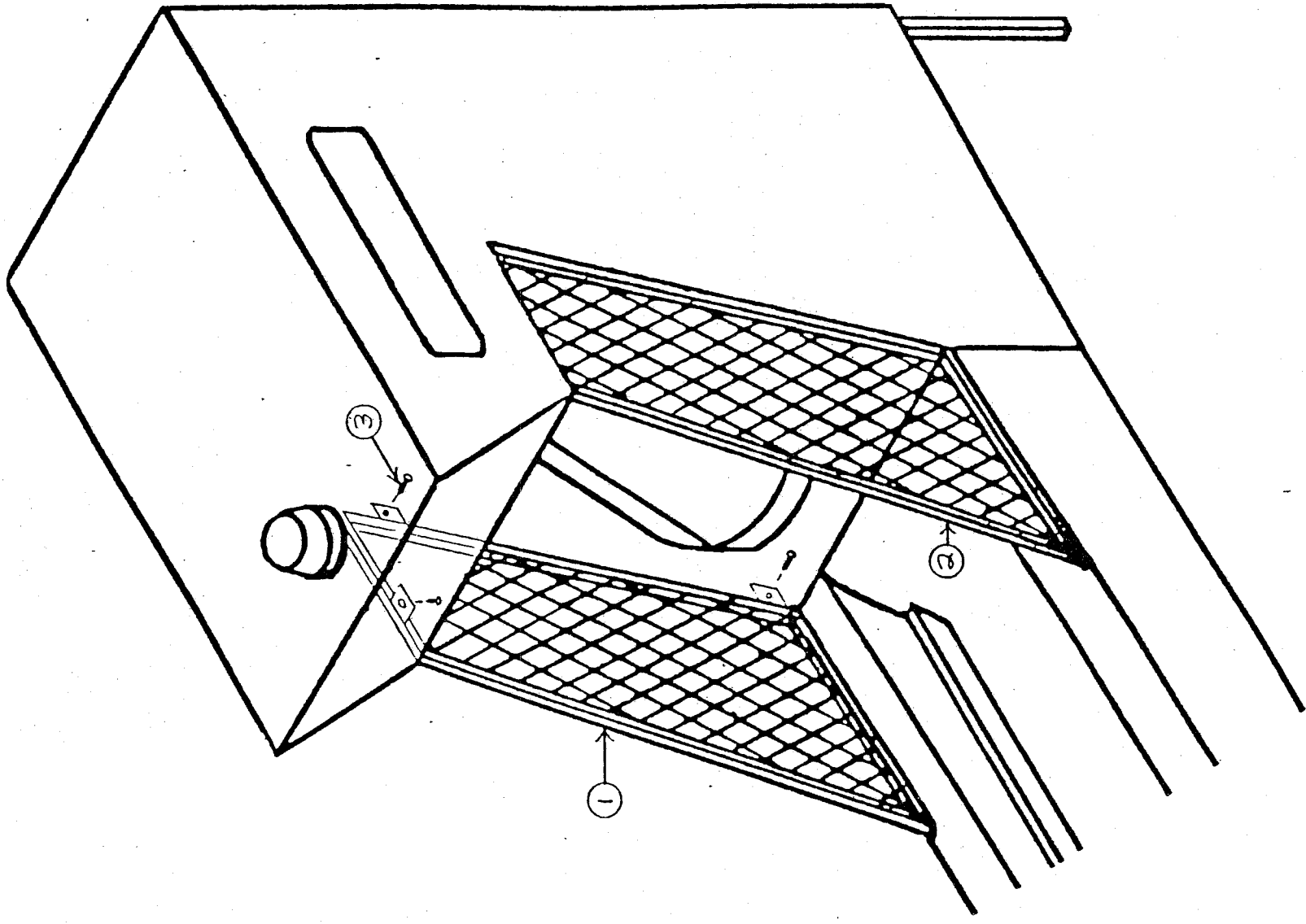


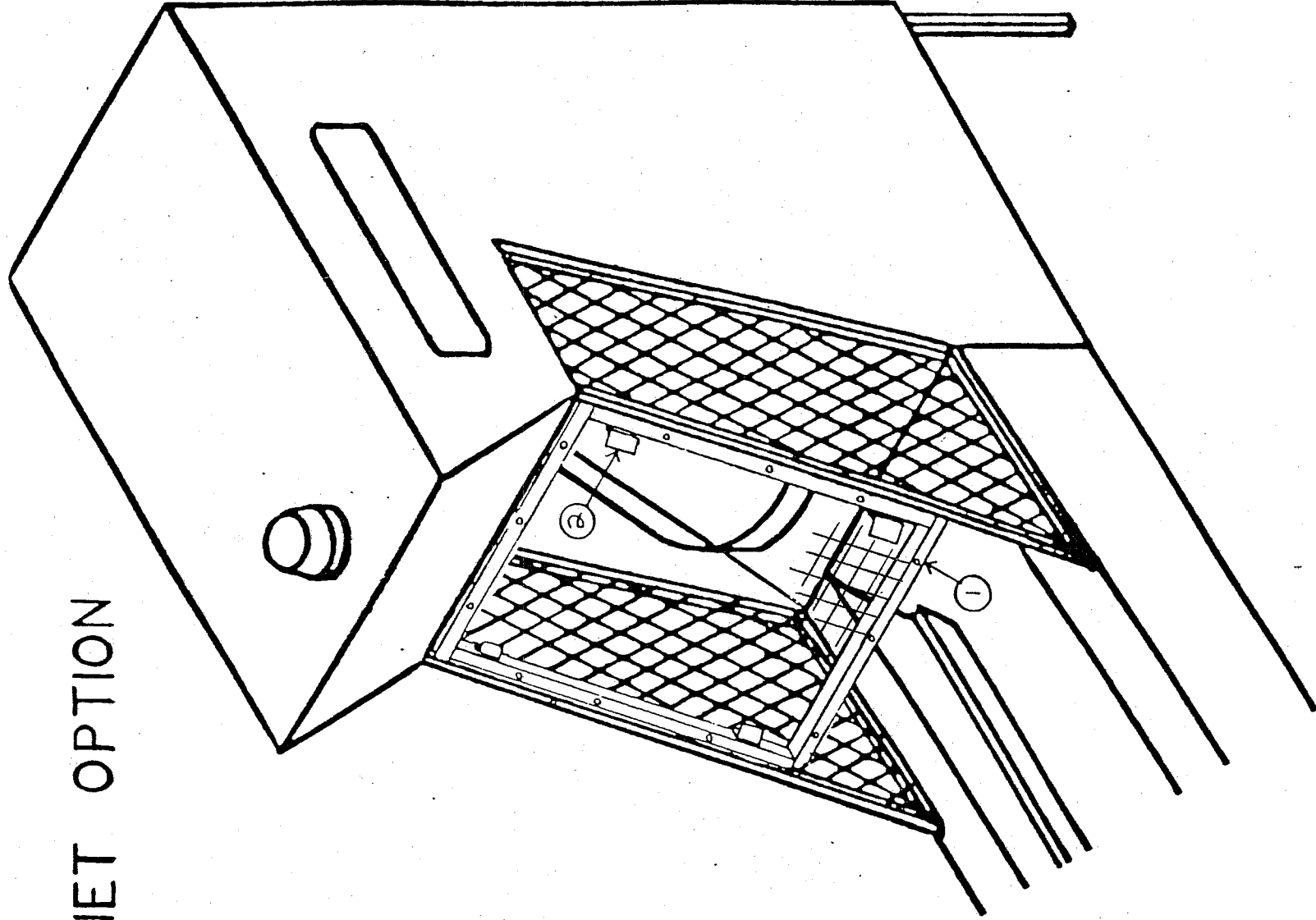
Figure 4

Item	Quantity	Description
1	2	1/2"-13 x 3" hex bolt
2	2	1/2" lock washer
3	2	1/2"-13 hex nut
4	2	Rear leg and leveler
5	4	5/16"-18 x 2 1/2" stop bolt
6	4	5/16" lock washer
7	4	5/16"-18 hex nut

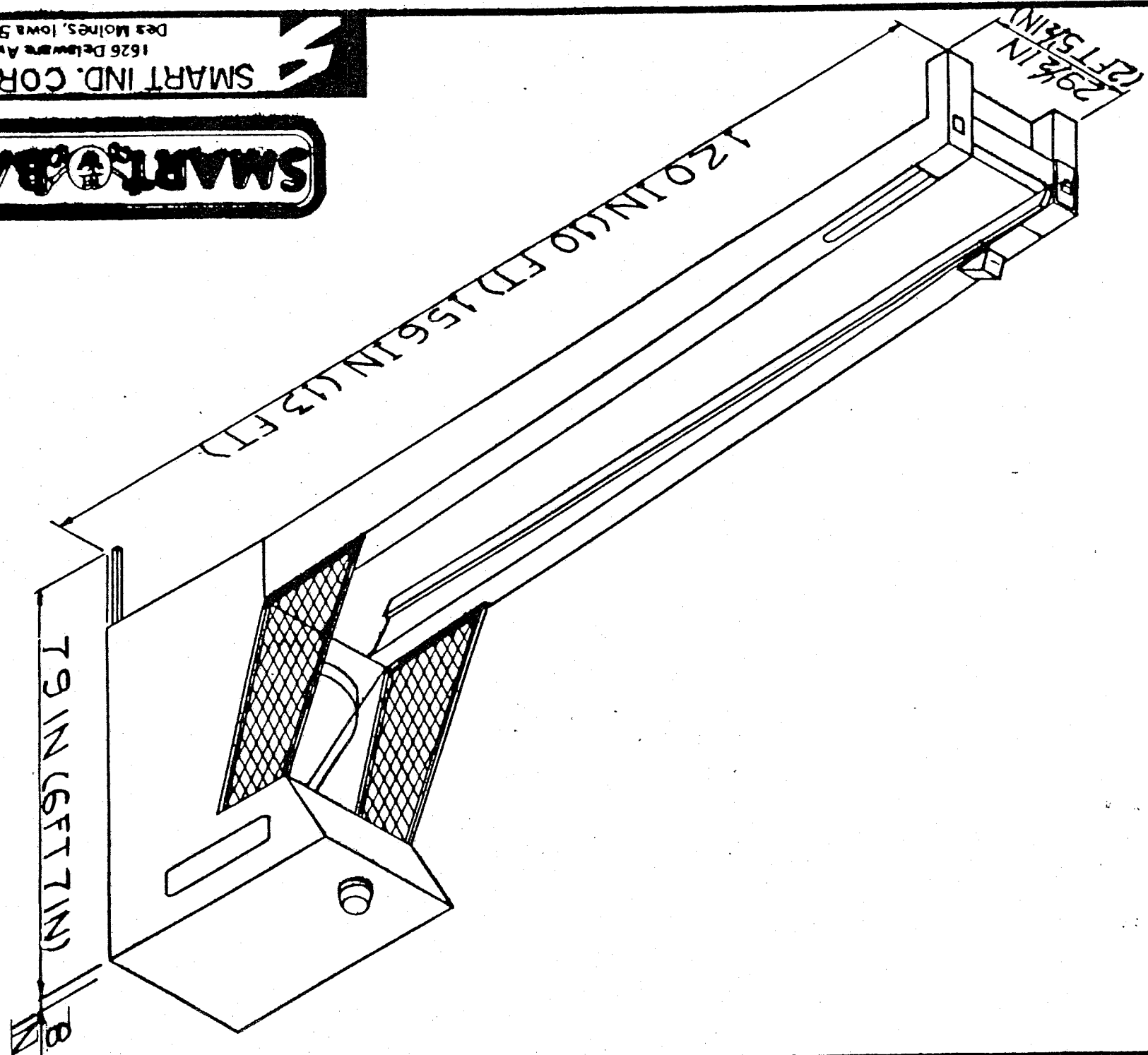


Item	Quantity	Description
1	1	Side Net, Left
2	1	Side Net, Right
3	6	Screw, #8 x 3/4"

FRONT NET OPTION



Item	Quantity	Description
1	1	Front Net Assembly
2	4	Front Net Clip

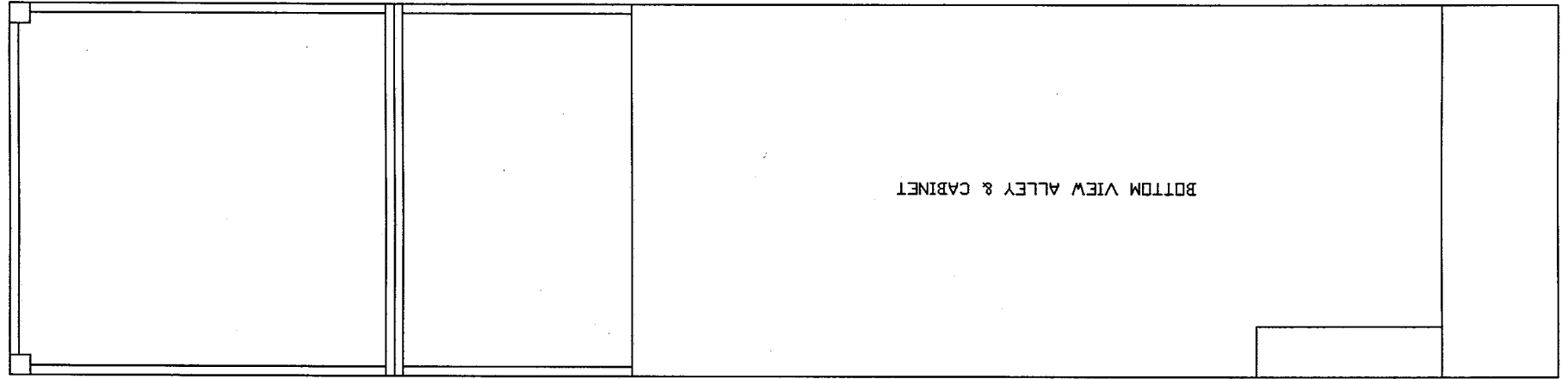
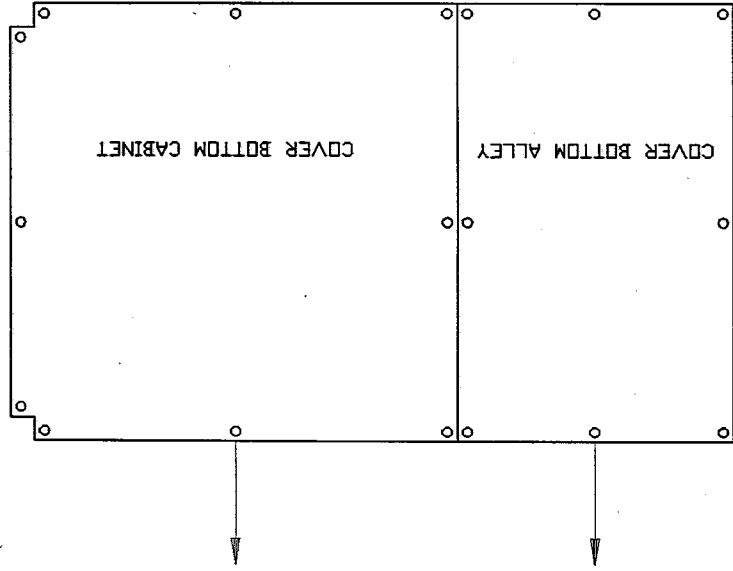


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INSTALLATION OF BOTTOM COVERS

ATTACH COVERS WITH #8 X 3/4 PB SCREWS PROVIDED IN ACCESSORY BOX



1 GAME RULES AND OPERATION

Smartball is an enhanced Skill Alley type game that challenges a player's ability to bowl into any of 7 playfield score pockets to achieve the highest score possible. The game comes with 128 x 64 resolution Gas Plasma graphics, and an audio system that fully informs each player of his or her progress throughout game play. Other built-in features include:

1. 1,2,3 or 4 Player game capability.
2. "Winner" event.
3. "Extra Balls" feature.
4. "Free Game" (per player).
5. "Jackpot" feature.
6. "Match Mode" feature.
7. Printout of bookkeeping information using the optional hand-held printer.
8. Full-blown Audit Mode for enhanced bookkeeping and game settings capability.

Other features include the "Enter your Initials" mode which incorporates the popular "high score" feature. This allows players to be listed by name on the "Final Scores" and "High Scores" screens in the order of their scores.

Please refer to section 1.2 -Game Operation and section 3 -Game Configuration for a detailed explanation of the above features.

1.1 Game Play Instructions

Referring to Figure 1.1 and Figure 1.3, locate and turn On the Power switch located in the Front Left Access Door of the Smartball unit.

A game in Smartball may simply be initiated by inserting the proper number of coins, per coinage setting, and depressing the Start button consequently. (Again, for coinage or any other setting changes, please refer to the Game Configuration section.)

Multi-player games

A 1,2,3, or 4 Player game may be played with Smartball. At least 1 credit would be required to initiate a 1 Player game, 2 for a 2 Player, 3 for a 3 Player, and 4 credits for a 4 Player game.

Provided credits are available, rapidly depress the Start button as many times as the number of players desired. Press Start accordingly:

- 1 time for a 1 Player game,
- 2 times for a 2 Player game,
- 3 times for a 3 Player game, and
- 4 times for a 4 Player game.

The player has a maximum of 2 seconds between each push of the Start button before the game assumes completion of player selection, and begins the game.

The player(s) then attempt to achieve "Winner", "Extra Balls", "Free Game", and "Jackpot" with the highest possible scores. Tickets may be dispensed at numerous points of the game per the operator's choice.

(Please note that all above features are turned On as factory default settings, and may be turned Off at the operators will. Again, the above settings and ticket dispensing information are provided in the Game Configuration section.)

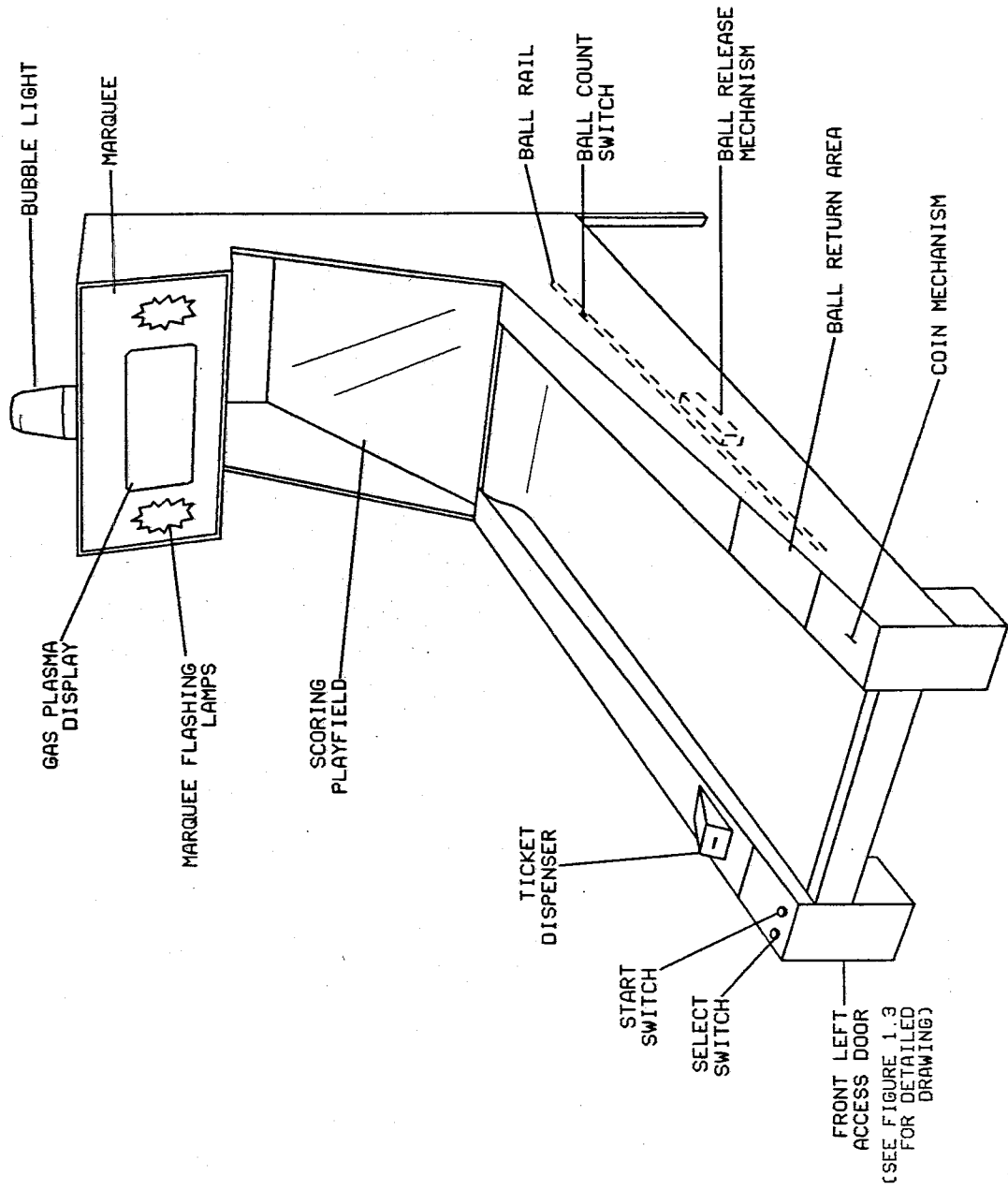


Figure 1.1 Smartball - operational features

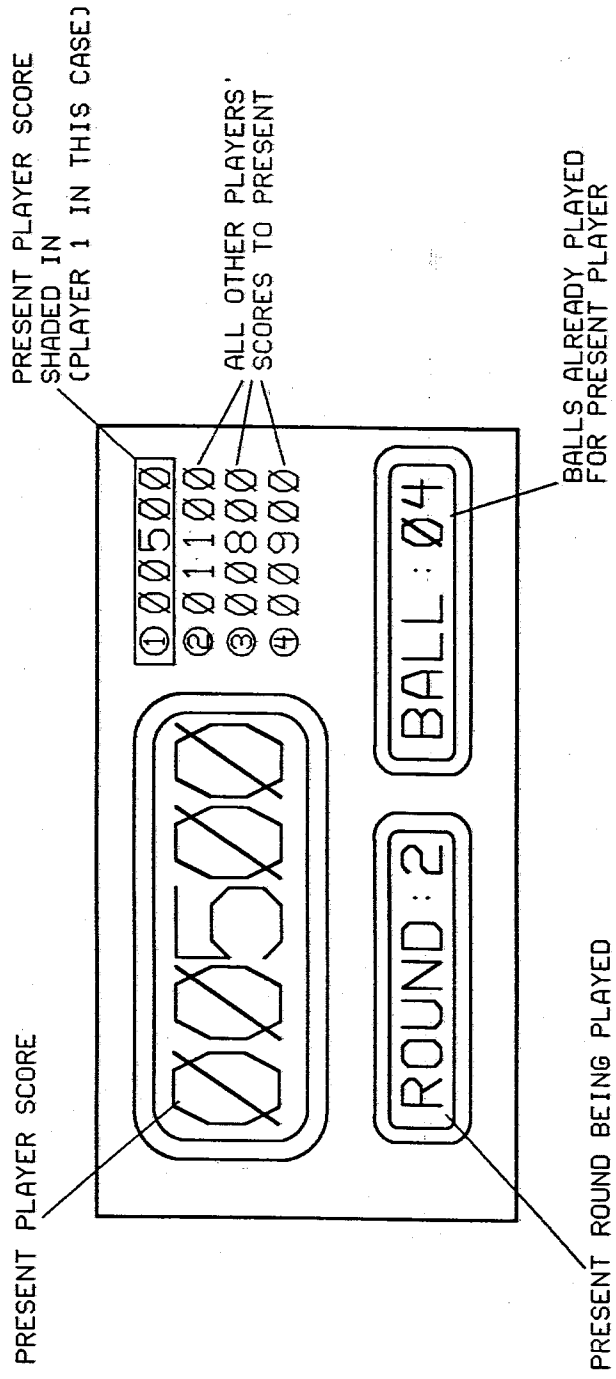


Figure 1.2 Game Play display format

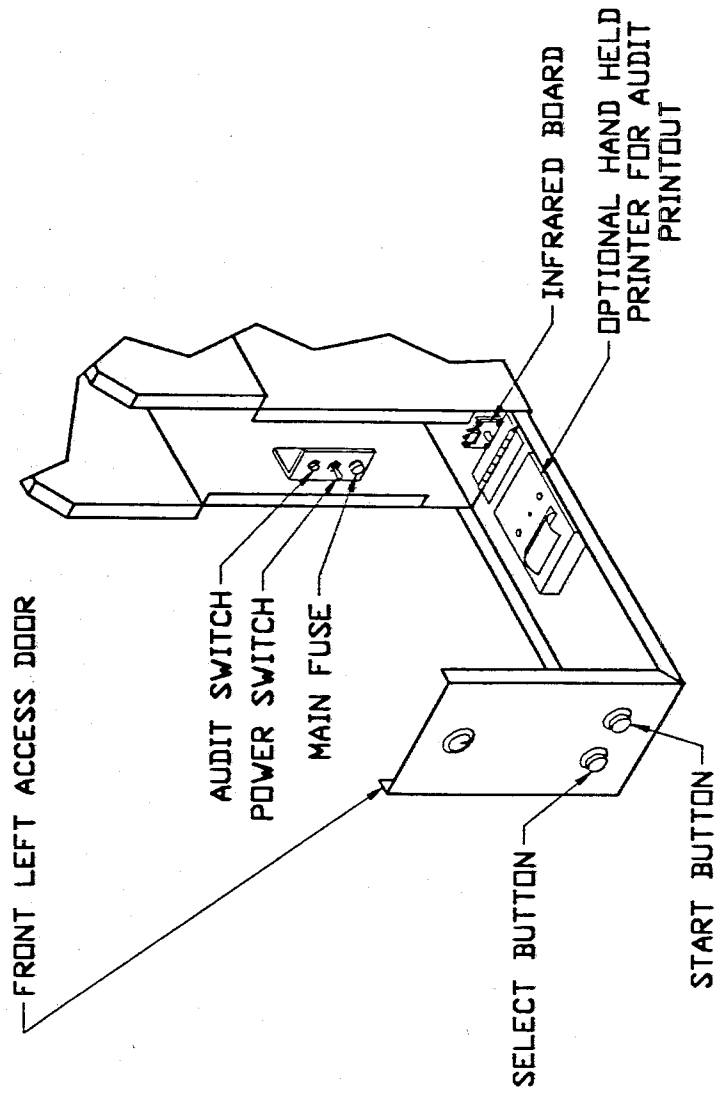


Figure 1.3 Front Left Access Door compartment

1.2 Game Operation

The player(s) may score to win at the following events. All underlined items are events that may be adjustable with DIP Switch settings or Audit settings.

"Winner" (First Ticket)

Aside from tickets given at game start, players may only win their first ticket upon reaching Winner score. Players will win consecutive tickets thereafter based on the Points per Ticket spread. The voice "Winner.. winner.. winner.." will be heard upon reaching this score, and the Bubble Light will operate.

Winner score - DIP Switches SW5 - 1,2,3 Default 1500
Points per Ticket - DIP Switch SW4 - 1,2 Default 300
Bubble Light to operate at Winner Score - Audit Setting #30 Default On

"Extra Balls"

An extra 3 balls are given to players at the Extra Balls score. In Multi-player games, Extra Balls are awarded to each player achieving this score. The voice "Bonus.. Extra.. extra.. extra.. Smartball.." will be heard, "Extra Balls" will appear on the screen, and the Bubble Light will operate.

Extra Balls (On or Off) - Audit Setting #18 Default On
Extra Balls score - Audit Setting #19 Default 4500
Bubble light to operate at Extra Balls - Audit setting #32 Default On

"Free Game"

A Free Game is won at Free Game score. The voice "A Free Game.." is heard, "Free Game" will appear on the screen, and the Bubble Light will operate.

Free Game (On or Off) - Audit Setting #16 Default On
Free Game score - Audit Setting #17 Default 5500
Bubble Light to operate at Free Game - Audit Setting #33 Default On
score

"Jackpot"

The total accumulated Jackpot number of tickets is awarded to the player at Jackpot score. Jackpot is incremented by 1 for every credit received in the game. The voice "Jackpot.. jackpot.. jackpot.." will be heard, "Jackpot" will be appear on the screen, and the Bubble Light will operate. Note that Jackpot dispenses tickets regardless of the Maximum Tickets setting.

Jackpot (On or Off) - Audit Setting #10 Default On
Minimum Jackpot setting (tickets) - Audit Setting #11 Default 100
Maximum Jackpot setting (tickets) - Audit Setting #12 Default 9990
Jackpot score - Audit Setting #13 Default 8000

Increment Jackpot per Coin / Credit
Clear Jackpot on Reset

Audit Setting #14
Audit Setting #15

Default Credit
Default No

The following three screens appear only after the game is over.

"Match Mode" screen

At the end of each game, each player has the opportunity to win a free game in Match Mode. The game generates a 2 digit number that is matched against the last 2 digits of each player's score in the previous game. If a match occurs, a free game results for that particular player. The resulting display is shown in Figure 1.4. The frequency of matching is controllable as shown below.

Match Mode (On or Off) -

Audit Setting #20

Default On

Match Percentage (matches per -
hundred games)

Audit Setting #21

Default 1%

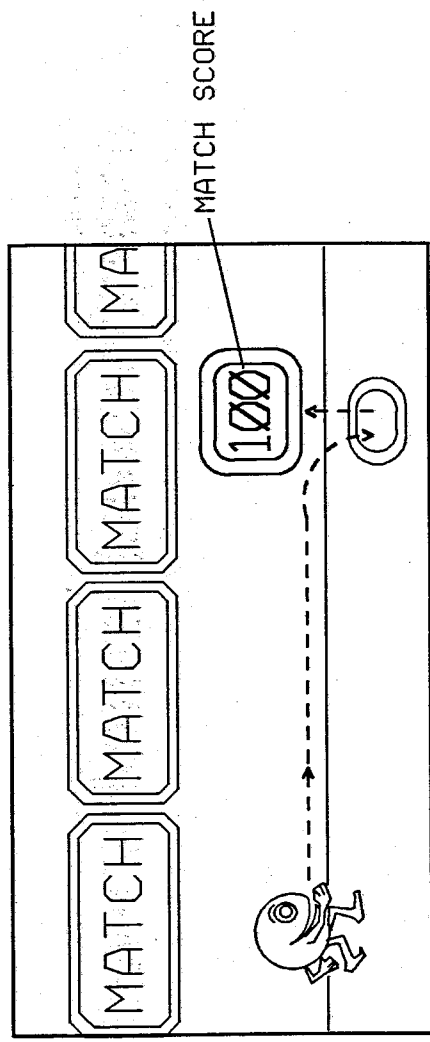


Figure 1.4 "Match Mode" screen

"Enter Your Initials" screen

This screen appears immediately after the Match Mode screen. Provided the highest score in the game just played exceeds any of the 10 highest scores displayed in the "High Scores" screen, the player may then enter his or her 3 initials here. The player has 15 seconds to use the Select button to enter each of the 3 initials. The Start button must be used to advance to the next initial, and to exit this screen. The game will automatically return to "Attract Mode" if time runs out.

"Final Scores & Tickets" screen

This screen appears immediately after the "Enter Your Initials" screen (if the player(s)' scores were high enough to be listed in the top 10), or immediately after the Match Mode screen. The player(s)' scores and total number of tickets won in the last game are listed on this screen.

"Attract Mode"

Smartball enters Attract Mode when first turned on, and remains in Attract Mode when no game is being played. This mode is essential in its attraction features on the display, as well as its audio effects. Included in the display features are:

- visual effects using the **Smartball** character,
- a "Jackpot" screen indicating the total number of tickets to be won (if Jackpot is On),
- a scoring information screen indicating:

- a) score to win "Jackpot",
- b) score to win "Free Game",
- c) score to win "Extra Balls",

provided only if these options are turned On (factory default is On - see Game Configuration)

- a "High Scores" screen indicating the 10 present highest scores along with the respective players' initials.

"Low Tickets" Indicator

When **Smartball** is low in tickets (approximately 1" of tickets remaining in the ticket stack), a "Flashing Diamond" appears on the lower left corner of the display as shown in Figure 1.5. This symbol only appears in Attract Mode.

"Too Many Balls" Indicator

When the **Smartball** alley contains too many balls, the "Too Many Balls" indicator appears as a flashing ball on the lower left corner of the screen, shown in Figure 1.5. The game is informed of extra balls by sensing switch action on the Ball Count switch when the unit is not in game play mode. This symbol only appears in Attract mode.

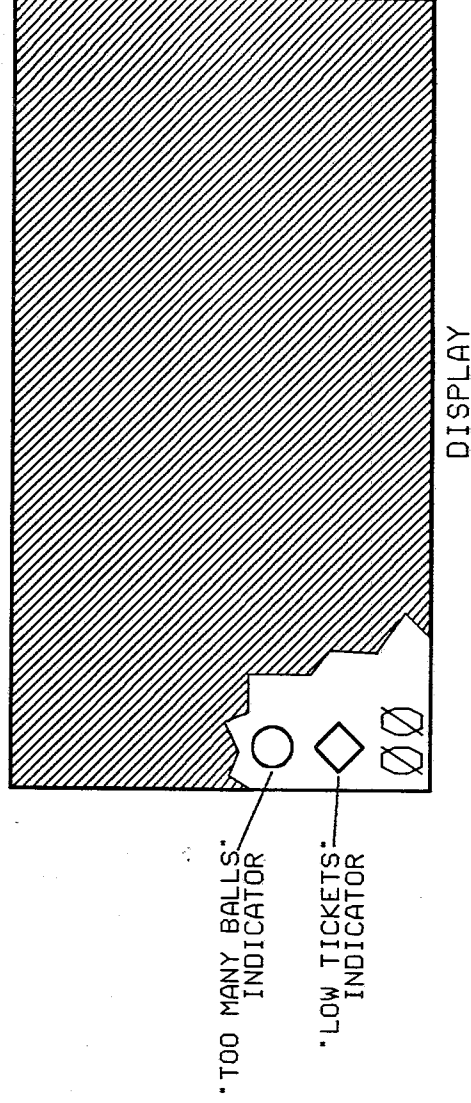


Figure 1.5 Warning Indicator screen

1.21 Circuit Boards

Three of the five Smart Industries circuit boards for Smartball are located on the Component Board (P/N 5328), mounted in the Electronics Compartment directly behind the Display Marquee. The remaining two boards are the Gas Plasma Display board, and the Infrared LED board located in the Front Left Access Door compartment.

Accessing the Circuit Boards

To access these boards, remove the plastic Marquee, the metal Display assembly, and slide out the Component Board as described in Figure 1.6.

HANDLE THE DISPLAY BOARD WITH EXTREME CAUTION AS IT IS VERY FRAGILE AND CONTAINS HIGH VOLTAGE CIRCUITRY!

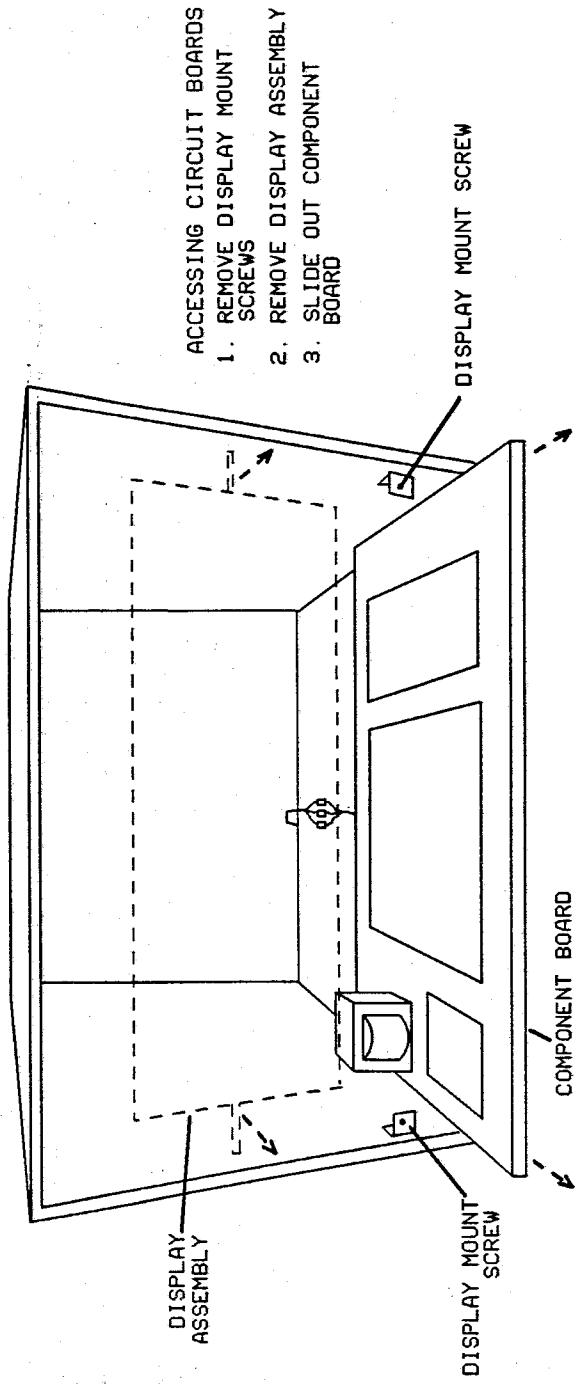


Figure 1.6 Accessing Smartball Component Board

CPU Board

The CPU Board, P/N 5306, handles all processing functions, all audio functions, and ticket dispenser, ticket meter, and coin meter output functions. This board must be equipped with the ROMs specified in the ROM Specification section.

Driver I/O Board

The Driver I/O Board, P/N 5240, drives all remaining functions such as the Bubble Light, the Gas Plasma display, the Ball Release solenoid, and the flashing Marquee lights. This board communicates directly with the CPU board via a 20 conductor ribbon jumper for most of its processing functions. On the other hand, all display processing is done on-board with graphics information stored in the on-board ROM. The Driver I/O board communicates with the Gas Plasma display via a 14 conductor ribbon cable.

The Driver I/O Board must be equipped with its own ROM, also listed in the ROM Specification section. This board also houses 1 of the 5 fuses used in **Smartball**. Fuse values are listed in the Fuse Specification section.

Power Supply Board

The Power Supply Board, P/N 5241, provides all DC supplies to the game. Voltages provided are +5V Regulated (logic and ticket/coin meters), +11V Unregulated (display power), +12V Regulated (ticket dispenser), and +16V Unregulated (audio, bubble light, and flashing marquee lights). The Power Supply Board houses 3 of the 5 fuses used in **Smartball**. Fuse values are listed in the Fuse Specification section.

Note that the 2 heatsinks located on this board are meant to reach a reasonably high temperature that would be uncomfortably hot to the touch. However, if these devices seem to be excessively hot, please refer to section 4.2 -Troubleshooting Guidelines, as this probably indicates a problem with the game. A word of caution: due to the normally high temperatures, please keep all objects clear of these heatsinks at all times!

Gas Plasma Display Board

The Gas Plasma Display Board, P/N 5119, has the display glass mounted on its front, and all necessary drive electronics mounted on its back. The circuitry uses the +11V Unregulated supply to the display to generate approximately +190V required for the gas plasma display illumination, and +5V Regulated supply for all logic functions. Both these supplies are provided with P3, the 5 Pin KK on-board connector. This board receives all necessary graphics information through serial clocking with P2, the 14 Pin IDC ribbon cable connector.

Infrared LED Board

The Infrared LED Board, P/N 5258, is located in the Front Left Access Door compartment, underneath the Power Switch and Fuse bracket (see Figure 1.3). This board communicates with the optional hand-held printer to enable the operator to print out game bookkeeping information at will. To learn of how to interface with the hand-held printer, see section 2.12 -Printing Audit Records and 4.1 -Diagnostics Mode (Audit #4 - Printing Game Settings).

1.22 Smartball ROM Specifications

DEVICE	PURPOSE	TYPE	LOCATION BOARD
1	Game	27C512	U8 CPU
2	Music/Speech	27C040	U16 CPU
3	Dot Matrix Display	27C020	U27 Driver I/O

Volume Adjustment / Audio Thermal Breakdown

Audio volume adjustment is made with the R78 pot. located on the CPU board.

Thermal Breakdown feature: The CPU Board incorporates thermal breakdown in its audio amplifier, U43, that shuts off the audio in instances of continuously high audio output levels. This situation only occurs in extreme conditions, and audio is quickly returned once cool down is achieved.

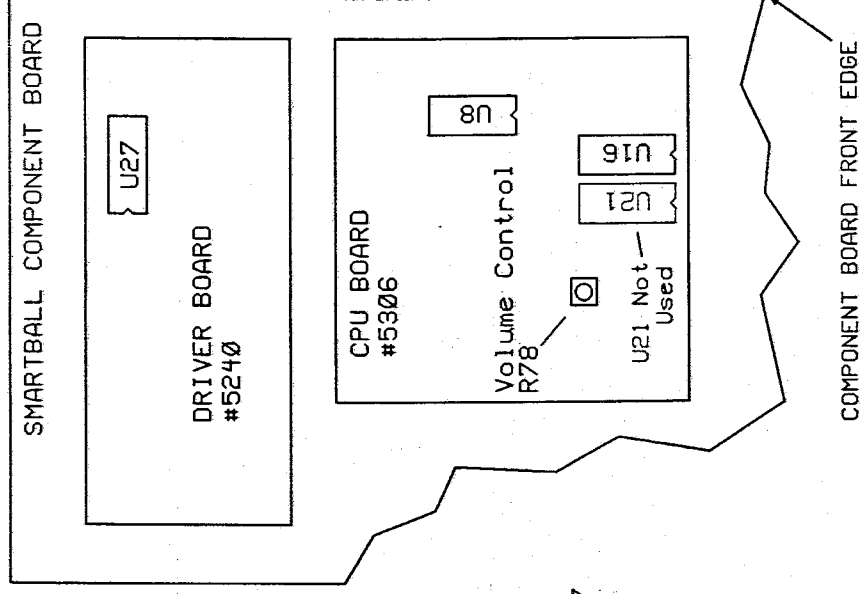


Figure 1.7
- ROM locations

1.23 Fuse List

Five fuses are located in the Smartball game.

The Main Fuse is located in the Front Left Access Door compartment, mounted adjacent to the Power Switch. The remaining switches are located on the Power Supply Board and on the Driver I/O Board.

The following fuse values always apply:

Main Fuse	
F1, Driver I/O Bd.	- 5 Amp Fast
F1, P. Supply Bd.	- 1 Amp Slow
F2, P. Supply Bd.	- 3 Amp Slow
F3, P. Supply Bd.	- 6 Amp Slow
	- 8 Amp Slow

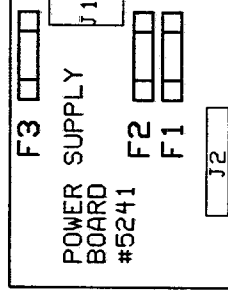
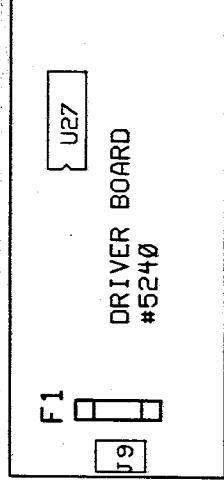


Figure 1.8
- Fuse Locations

2 GAME BOOKKEEPING FUNCTIONS

All Smartball bookkeeping information can be obtained from the Audit Mode.

The Audit Mode

To enter Audit Mode, the game must first be in Attract Mode. Referring to Figure 1.3, the Front Left Access Door diagram, locate the Audit switch.

Press in the Audit switch **once**.

- The 'SMARTBALL AUDITS' screen should appear displaying the following:

- A AUDIT INFORMATION
- B GAME SETTINGS
- C DIAGNOSTICS

At this point,

Press in the Audit switch to enter the AUDIT INFORMATION mode. Refer to section 2.1 - Audit Information.

Press in the Start switch to enter GAME SETTINGS mode. Refer to section 3 - Game Configuration.

Press in the Select switch to enter DIAGNOSTICS mode. Refer to section 4.1 - Diagnostics Mode.

2.1 Audit Information

The 'AUDIT RECORDS' screen should appear displaying the following:

- A NEXT AUDIT
- B PRINT AUDIT RECORDS

At this point,

Press in the Audit switch for NEXT AUDIT to review the remaining Audit Records. Refer to section 2.11 - Audit Records.

To PRINT AUDIT RECORDS, please review section 2.12 - Printing Audit Records for a detailed explanation. Note that the *optional hand-held* printer will be necessary to accomplish this task.

2.11 Audit Records

All the game's bookkeeping functions can be accessed in this mode.

Press in the Audit switch to *progress* through the following audits.

Press in the Start switch to *clear* any of the following audits.

<u>Audit #</u>	<u>Description</u>	<u>Capacity</u>
1	Total number of Coins Inserted (this value is not cleared upon Reset)	6 digits
2	Total number of Coins Inserted since the game was turned on (this value is cleared upon Reset)	6 digits
3	Total number of Tickets Dispensed (this value is not cleared upon Reset)	6 digits
4	Total number of Tickets Dispensed since the game was turned on (this value is cleared upon Reset)	6 digits
5	Total Number of Games Played (this value is not cleared upon Reset)	6 digits
6	Total Number of Games Played since the game was turned on (this value is cleared upon Reset)	6 digits
7	Average Tickets per Game	6 dig . 4 dig (000000.0000)
8	Total number of times Jackpot has been won (this value is not cleared upon reset)	6 digits
9	Total number of times Jackpot has been won since turned on (this value is cleared upon reset)	6 digits
10	Total number of times Extra Balls has been won (this value is not cleared upon reset)	6 digits
11	Total number of times Extra Balls has been won since turned on (this value is cleared upon reset)	6 digits
12	Total number of Free Games won (this value is not cleared upon reset)	6 digits
13	Total number of Free Games won since turned on (this value is 6 digits cleared upon reset)	6 digits

<u>Audit #</u>	<u>Description</u>	<u>Capacity</u>
14	Total number of times Match for free game has been given (this value is not cleared upon reset)	6 digits
15	Total number of times Match for free game has been given since turned on (this value is cleared upon reset)	6 digits
16	Total number of 1 Player games	6 digits
17	Total number of 2 Player games	6 digits
18	Total number of 3 Player games	6 digits
19	Total number of 4 Player games	6 digits
20	Score for Player 1 in Last game	6 digits
21	Score for Player 2 in Last game	6 digits
22	Score for Player 3 in Last game	6 digits
23	Score for Player 4 in Last game	6 digits
24	Number of Tickets won by Player 1 in Last game	6 digits
25	Number of Tickets won by Player 2 in Last game	6 digits
26	Number of Tickets won by Player 3 in Last game	6 digits
27	Number of Tickets won by Player 4 in Last Game	6 digits
28	Number of Automatic Ball returns (the number of times the 'Balls' digit on the display increments due to lapsed time)	6 digits

Depress the Audit switch again to return to Attract Mode.

2.12 Printing Audit Records

Turn On the optional hand-held printer. Referring to Figure 2.1, lay the printer down in the door area so that the lighted red window on the printer faces the Infrared Board as shown. The printer should be no further than 7 inches, and no closer than 4 inches to the Infrared Board.

First, press in the Audit switch *twice* to get into the Audit Information mode (as described in section 2.1).

Now press in the Select switch.

The printer will now start printing out the bookkeeping records.

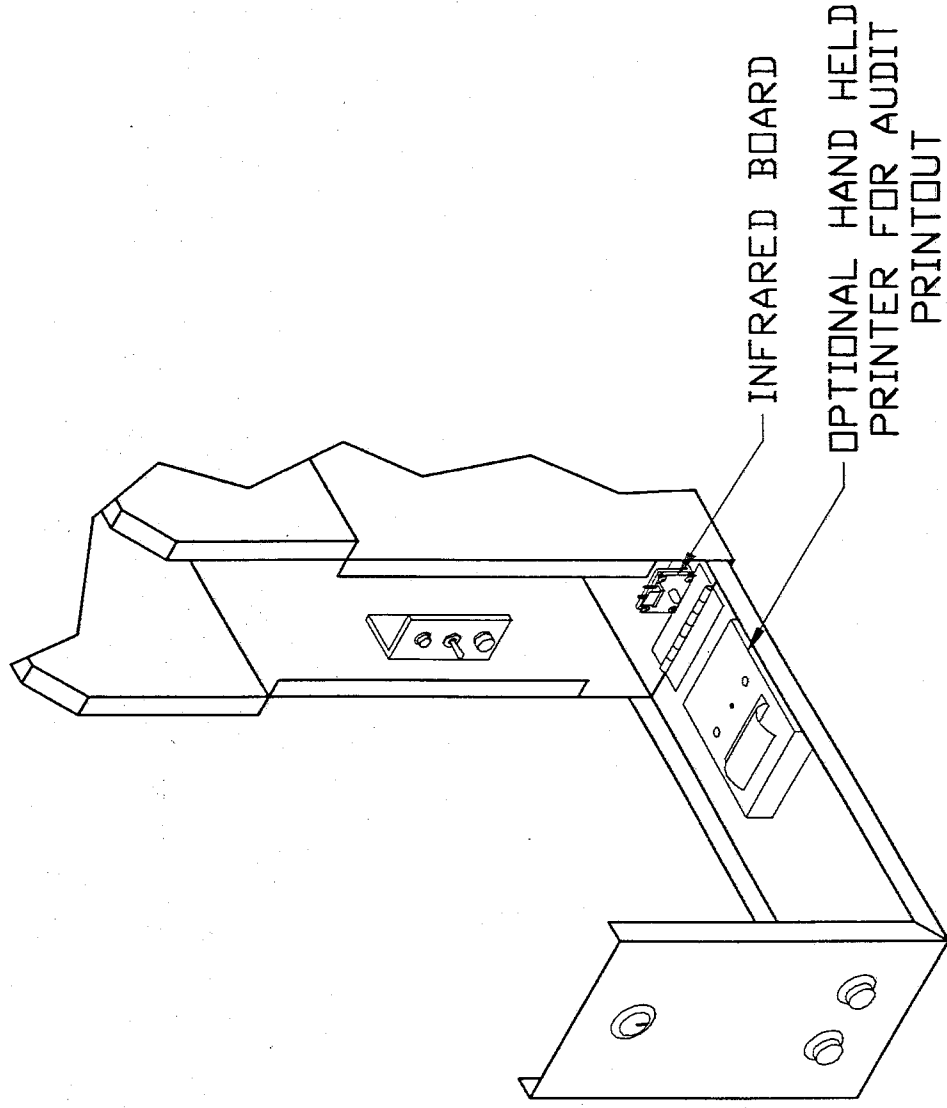


Figure 2.1 Locating optional hand-held printer for Audit printouts

3 GAME CONFIGURATION

The Smartball game can be configured by either the Audit Mode Game Settings or by the DIP Switch Game Settings.

To receive a printout of present game configuration using the optional hand-held printer, see 4.1 -Diagnostics Mode Audit #4.

3.1 Game Settings - Audit Mode

Press in the Audit switch to enter Audit Mode. The 'SMARTBALL AUDITS' screen will appear.

Now, press in the Start switch to enter the Game Settings mode. Audit '0' is now displayed.

Press in the Audit switch to advance to the next audit.

The following Game Setting values may be changed by using the Start or Select button. The Start button may be used to increment setting values, and the Select button to decrement setting values.

Note: Some game settings are shared by both Audits and DIP Switch Settings. Therefore, when changing a setting, check to make sure that there is no conflict between Audits and Dip Switch settings!

<u>Audit #</u>	<u>Description</u>	<u>Default</u>
0	DIP Switch SW4 settings (review only)	-
1	DIP Switch SW5 settings (review only)	-
2	Machine Identification Number (4 digit)	0000
3	Reset to Default settings - use the <u>Select</u> switch to Reset (All settings will fall to default values shown in the right hand column, except settings shared with DIP Switch settings. These settings take on the DIP Switch values)	-

<u>Audit #</u>	<u>Description</u>	<u>Default</u>
4	Ticket Dispenser (On or Off) - to activate or deactivate ticket dispenser	On
5	Winner Score (same as SW5 - 1,2,3) - score to win first ticket	DIP Switch SW5 - 1,2,3
6	Points per Ticket (same as SW4 - 1,2) - score interval for ticket dispenses	DIP Switch SW4 - 1,2
7	Tickets at Game Start - free tickets at game start (per player)	1 ticket
8	Maximum Tickets - maximum tickets each player may win - does <u>not</u> affect Jackpot tickets	8 tickets
9	Ticket Multiplier (same as SW4 - 3,4) - may get 1 to 10 tickets per ticket dispense	DIP Switch SW4 - 3,4
10	Jackpot (On or Off)	On
11	Minimum Jackpot Setting - number of tickets that Jackpot starts at	100 tickets
12	Maximum Jackpot Setting - maximum number of Jackpot tickets that can be won	9990 tickets
13	Jackpot Score - score to win Jackpot	8000 points
14	Jackpot Increment (Coin or Credit) - Jackpot increases value by 1 for every coin or credit	Credit
15	Clear Jackpot on Reset - Jackpot loses its accumulated value when game is turned off and on again	No
16	Free Game (On or Off)	On
17	Free Game Score - score at which Free Game is won	5500 points
18	Extra Balls (On or Off)	Yes
19	Extra Balls Score - score at which 3 extra balls are won	4500 points
20	Match Mode (On or Off)	On
21	Match Score Percentage - percentage of score matches	1%

<u>Audit #</u>	<u>Description</u>	<u>Default</u>
22	Ball Return Time - maximum time allowed between balls before the "Balls" digit is incremented by 1	2 Minutes
23	Balls per Game (same as SW4 - 5) - Choose between 6 balls (2 rounds) or 9 balls (3 rounds) per game	DIP Switch SW4 - 5
24	Clear High Score on Reset - game loses all accumulated high scores when game is turned off and on again	No
25	Attract Music (On or Off) - music for Attract Mode	On
26	Attract Siren (On or Off) - 'siren' sound for Attract Mode	On
27	Attract Voice (On or Off) - voice for Attract Mode	On
28	Attract Bubble Light (On or Off) - bubble light operating during Attract Mode	On
29	Game Music (On or Off) - music during game play	On
30	Bubble Light at Winner (On or Off) - bubble light operating at Winner score	On
31	Bubble Light at Jackpot (On or Off) - bubble light operating at Jackpot win	On
32	Bubble Light at Extra Balls (On or Off) - bubble light operating at Extra Balls win	On
33	Bubble Light at Free Game (On or Off) - bubble light operating at Free Game win	On
34	"Enter Your Initials" and "Final Scores" screen (On or Off) - option to eliminate these screens	On
35	Multiplayer Option (On or Off) On - 1,2,3 or 4 Player games may be played Off - only a 1 Player game may be played	Off
36	Start new game with Coin Drop (On or Off) A new game may be started at any time by inserting a coin, regardless of whether in game play or not.	Yes
37	<u>Exit Audits and return to Attract Mode</u>	

3.2 GAME SETTINGS – DIP SWITCHES (SMARTBALL)

SW4		1	2	3	4	5	6	7	8
NUMBER OF POINTS PER TICKET	<u>300</u>	<u>OFF</u>	<u>OFF</u>						
	400	ON	OFF						
	500	OFF	ON						
	700	ON	ON						
NUMBER OF TICKETS PER DISPENSE	<u>1</u>			<u>OFF</u>	<u>OFF</u>				
	2			ON	OFF				
	3			OFF	ON				
	4			ON	ON				
NUMBER OF BALLS PER GAME	<u>9 BALLS</u>					<u>OFF</u>			
	6 BALLS					ON			
NUMBER OF COINS PER GAME	4						OFF	OFF	
	3						ON	OFF	
	2						OFF	ON	
	<u>1</u>						ON	ON	
ATTRACT MODE SOUND AND WINNER LIGHT	OFF								<u>OFF</u>
	<u>ON</u>								<u>ON</u>

SW5		1	2	3	4	5	6	7	8
WINNER SCORE FOR FIRST TICKET	500	<u>OFF</u>	<u>OFF</u>	<u>OFF</u>					
	1000	ON	OFF	OFF					
	<u>1500</u>	<u>OFF</u>	<u>ON</u>	<u>OFF</u>					
	2000	ON	ON	OFF					
	3500	OFF	OFF	ON					
	5000	ON	OFF	ON					
	7000	OFF	ON	ON					
9000	ON	ON	ON						
BURN IN TEST	OFF								<u>OFF</u>
	<u>ON</u>								<u>ON</u>

(UNDERLINED OPTIONS ARE STANDARD FACTORY SETTINGS)

4 DIAGNOSTICS AND TROUBLESHOOTING

4.1 - Diagnostics Mode

Enter Audit Mode by pressing in the Audit switch once.

Upon entering Audit Mode, press the Select button once to enter the Diagnostics Mode.

Audit #1

The "DIAGNOSTICS TESTS" screen should appear, displaying the following:

- Smartball Driver I/O Board Program Version
- RAM check results
- ROM check results
- EPROM Checksum Number (4 digit number)

Audit #2

Press in the Audit switch once, and the **Switch Diagnostic Test 1** (screen 1) should appear.

Press in the Audit switch again, and the **Switch Diagnostic Test 2** (screen 2) should appear.

For normal operation, all switches should remain open except Ticket Empty that remains closed (provided there are sufficient tickets in the machine, and tickets are being fed through the ticket dispenser!).

Audit #3

Press in the Audit switch again, and then press in the Start switch to begin the **Display Tests**.

Display test: Two lines should appear, with one conducting the horizontal test, followed by the other for the vertical test. Look for faulty display problems such as dots not illuminating during this test.

Audit #4

Press in the Audit switch again, and then press in the Start switch to **Print Out Game Settings**. See 2.12 Printing Audit Records for a guide to the optional hand-held printer placement and operation. Note that Game Settings are printed out this time, and not Audit Records.

4.2 - Troubleshooting Guidelines

1. Display does not light up, or "garbage" appears on the screen:
 - a - Turn off the machine, wait for about 5 seconds, and turn on the machine again.
 - b - Check that P3 (5 Pin KK) and P2 (14 Pin Ribbon) connections entering the Display Board are secure.
 - c - Make sure that the locking tab on P3 is facing away from the board! This ensures that the display is receiving power.
 - d - Check that CPU Board ROM U8 and Driver I/O Board ROM U27 are present and seated correctly.
 - e - If L3, the green LED on the CPU Board, is not flashing, or flashing very slowly, remove the 20 conductor ribbon jumper cable, and reconnect it properly.
 - f - Check that all wire connections on the electronics board are good, especially to the Power Supply Board.
 - g - Take voltage checks across P3 on the Display Board for the following readings:

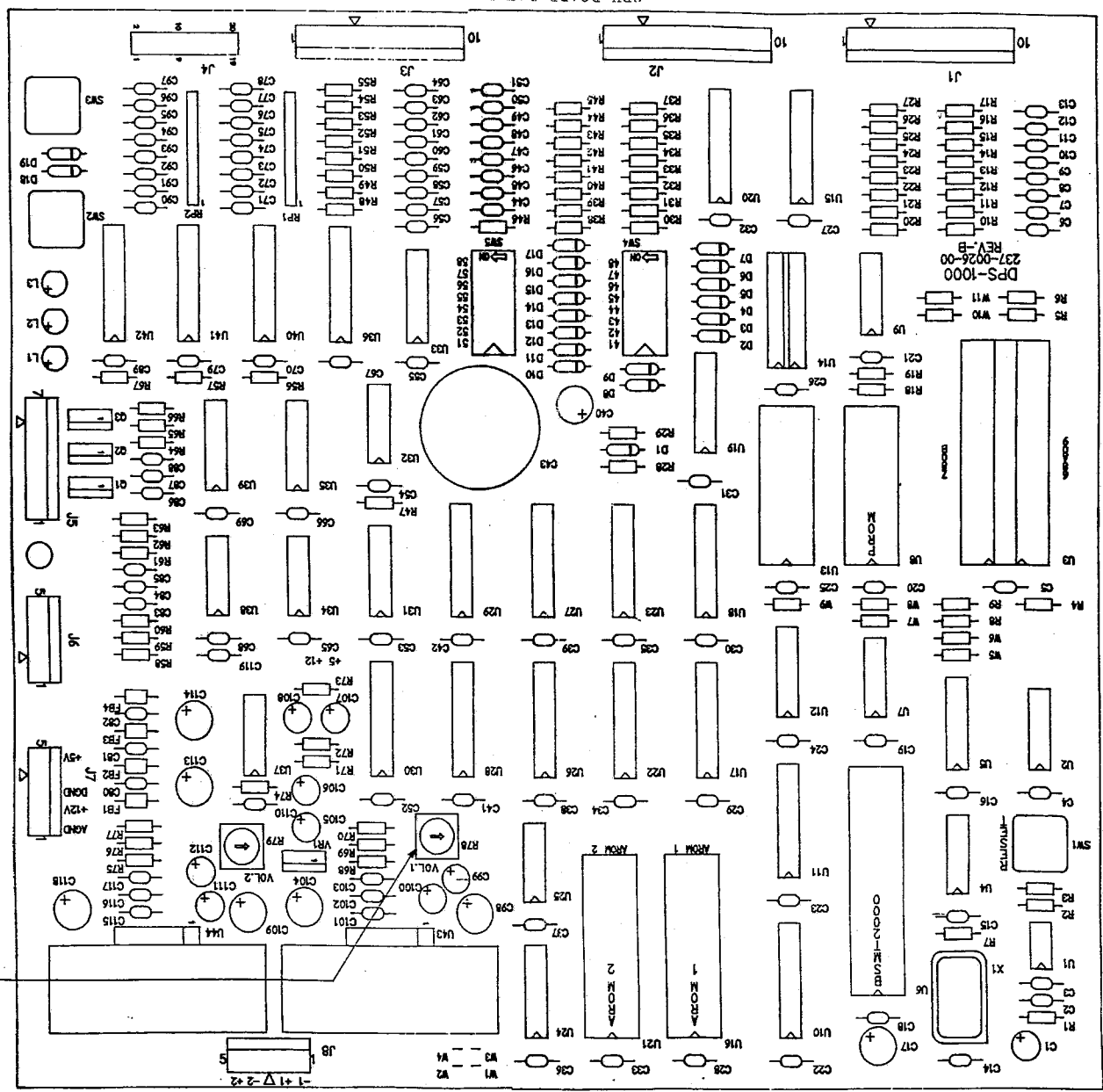
Pins 3 and 1 (red and black) --	+4.9 to 5.2 Volts DC
Pins 2 and 1 (white and black) --	+10.0 to 12.5 Volts DC

Voltages outside of this range indicate a power supply problem. Check the Power Supply Board fuses. If okay, then unplug J1 of the Power Supply Board, and take AC voltage readings on the J1 connector itself for the following readings:

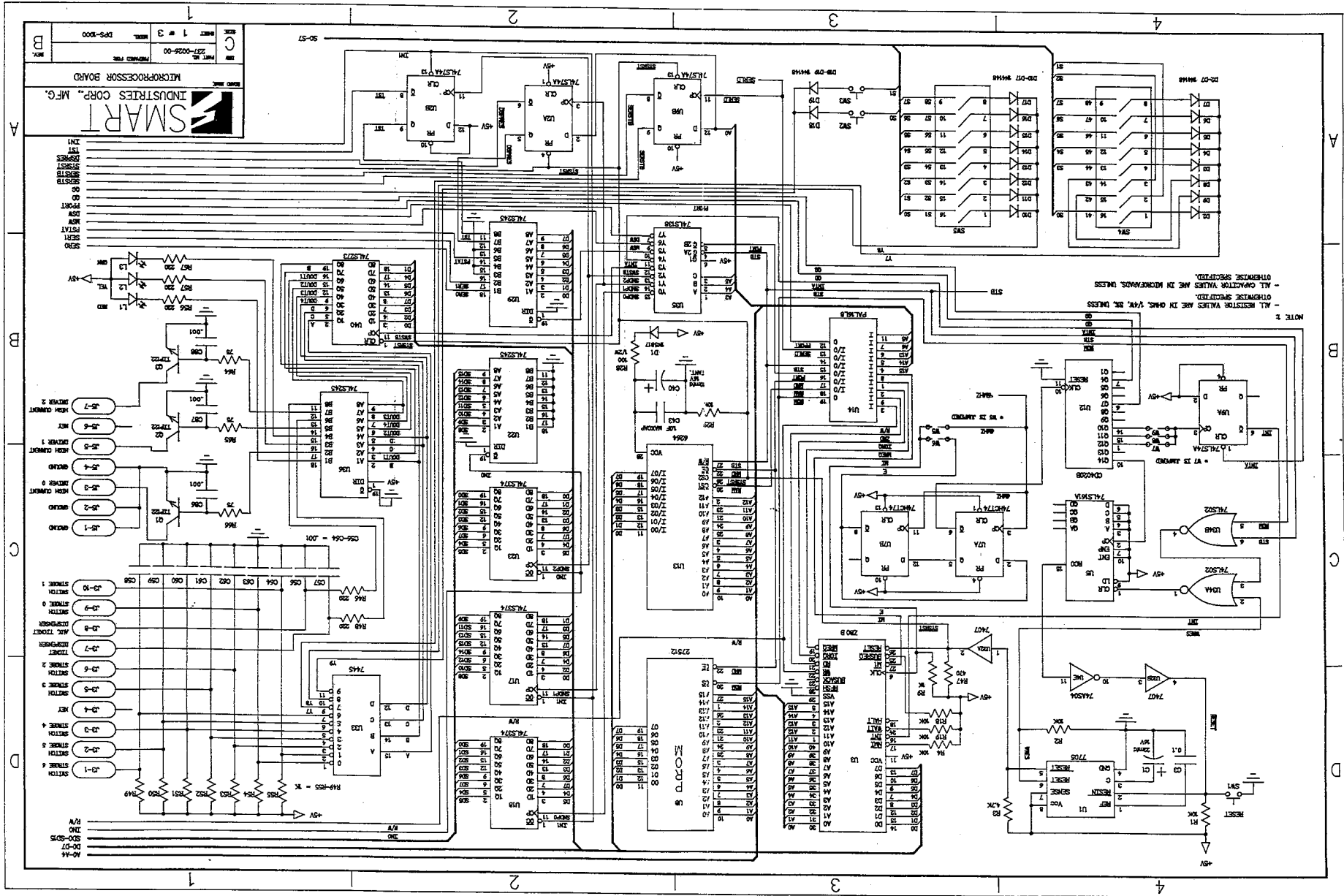
Pins 1 and 2 (yellow and yellow) --	7.5 to 9.0 Volts AC
Pins 4 and 5 (red and red) --	24 Volts AC
Pins 6 and 7 (blue and blue) --	12 Volts AC

take voltage readings across the red and black wires going to the Power Supply Board for +5 Volts, and across the yellow and black wires for +16 Volts. If these measurements fail, unplug J7 of the CPU board and J8 of the Driver I/O Board. Take the readings again. If the readings are still bad, replace the Power Supply Board (#5241) and reconnect.

- h - Otherwise, if the readings are good, reconnect J7 to the CPU board. If the readings are now bad, replace the CPU board (#5306) and reconnect.
 - i - Otherwise, if the readings are still good, reconnect J8 to the Driver I/O Board. If the readings are now bad, replace the Driver I/O Board (#5240).
 - j - If all above tests fail, replace the Display Board (#5119).
2. Audio is disrupted or is not heard at all:
 - a - Check that the CPU Board ROM U16 is present and seated properly.
 - b - Check that the volume control R78 on the CPU Board is turned up.
 - c - Check all the electronics board wire connections and trace for bad connections in the interconnect cables all the way through the game to the speaker.
 - d - Check for +16 Volts across the yellow and black wire at J7 of the CPU Board.
 - e - Replace the speaker.
 - f - If all else fails, replace the CPU Board (#5306).



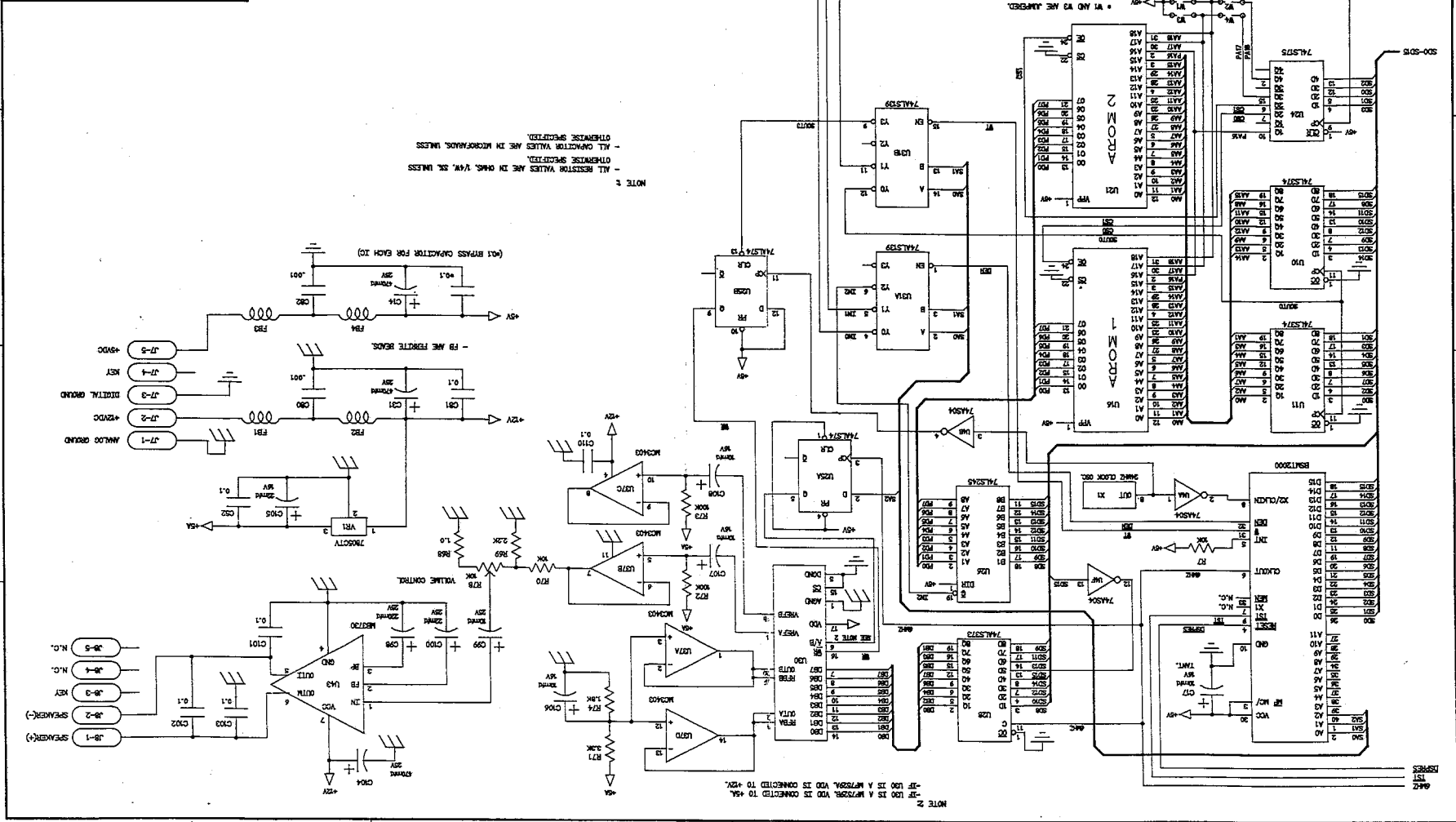
ON-BOARD VOLUME CONTROL



SMART
INDUSTRIES CORP. MFG.

MICROPROCESSOR BOARD

REV. C	2371-0028-00	REVISED DATE
SHEET 2 OF 3	DATE	DPS-1000

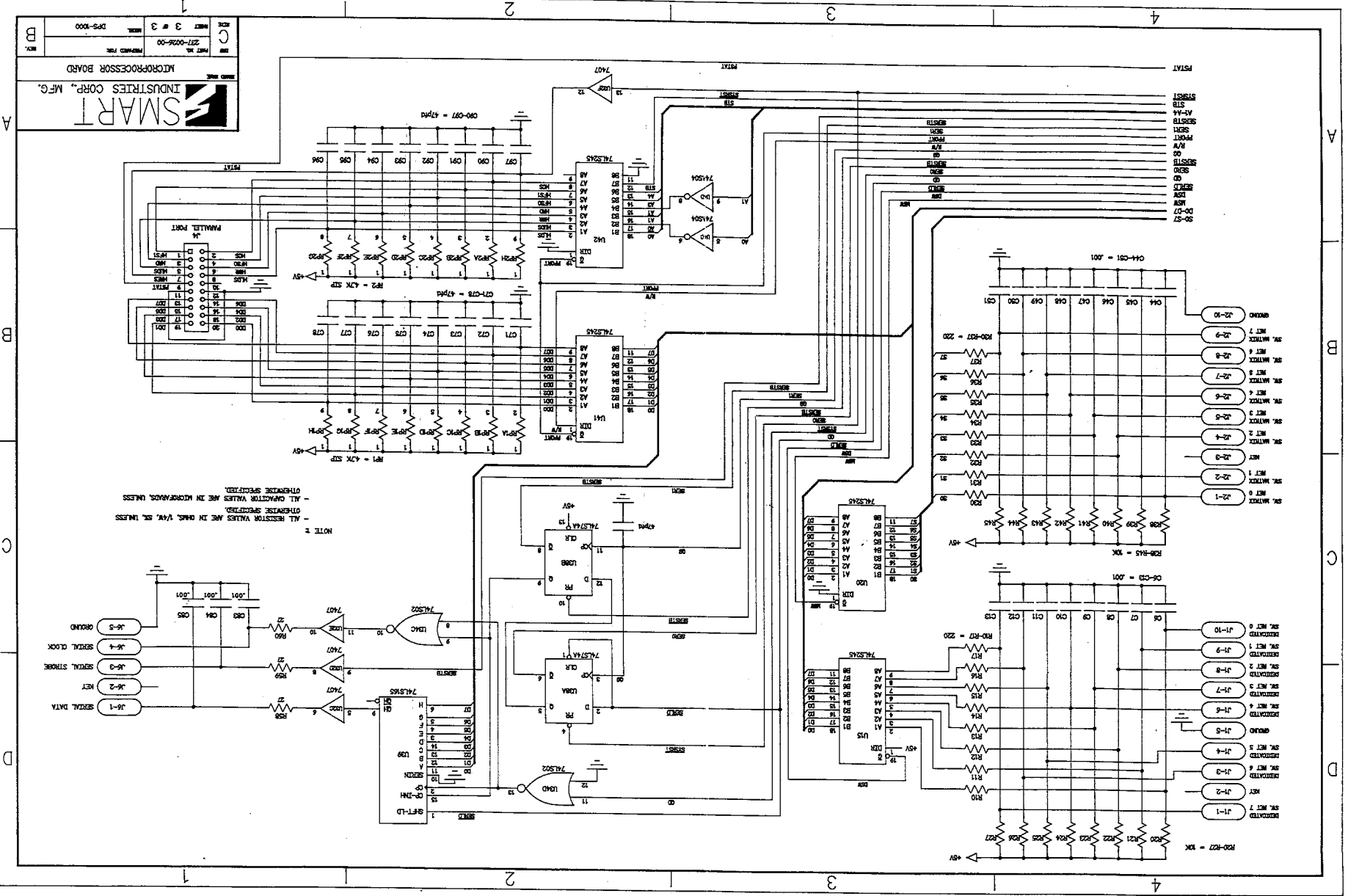



NOTE 1 - ALL RESISTOR VALUES ARE IN OHMS, V/W, OR UNLESS OTHERWISE SPECIFIED.
- ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.

NOTE 2 - IF U20 IS A 47529L, VDD IS CONNECTED TO +5V.
- IF U20 IS A 47529L, VDD IS CONNECTED TO +5V.

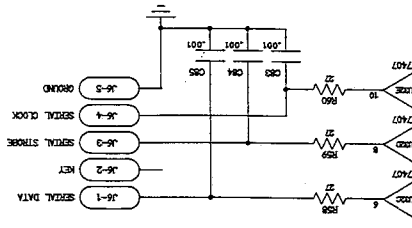
1 2 3 4

A B C D



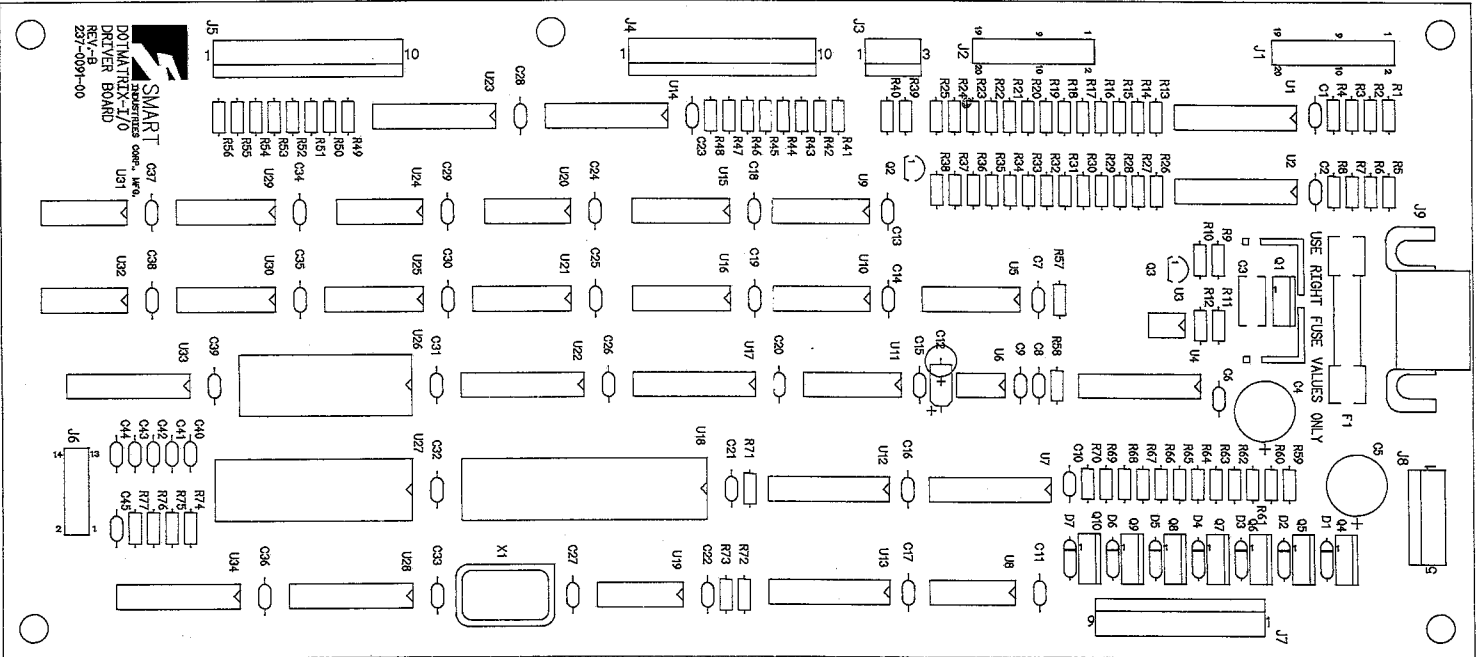

SMART
 INDUSTRIES CORP., MFG.
 MICROPROCESSOR BOARD
 PART NO. 271-0026-00
 REV. 3 OF 3
 DATE 08-10-80
 DESIGNED BY DRS-1000

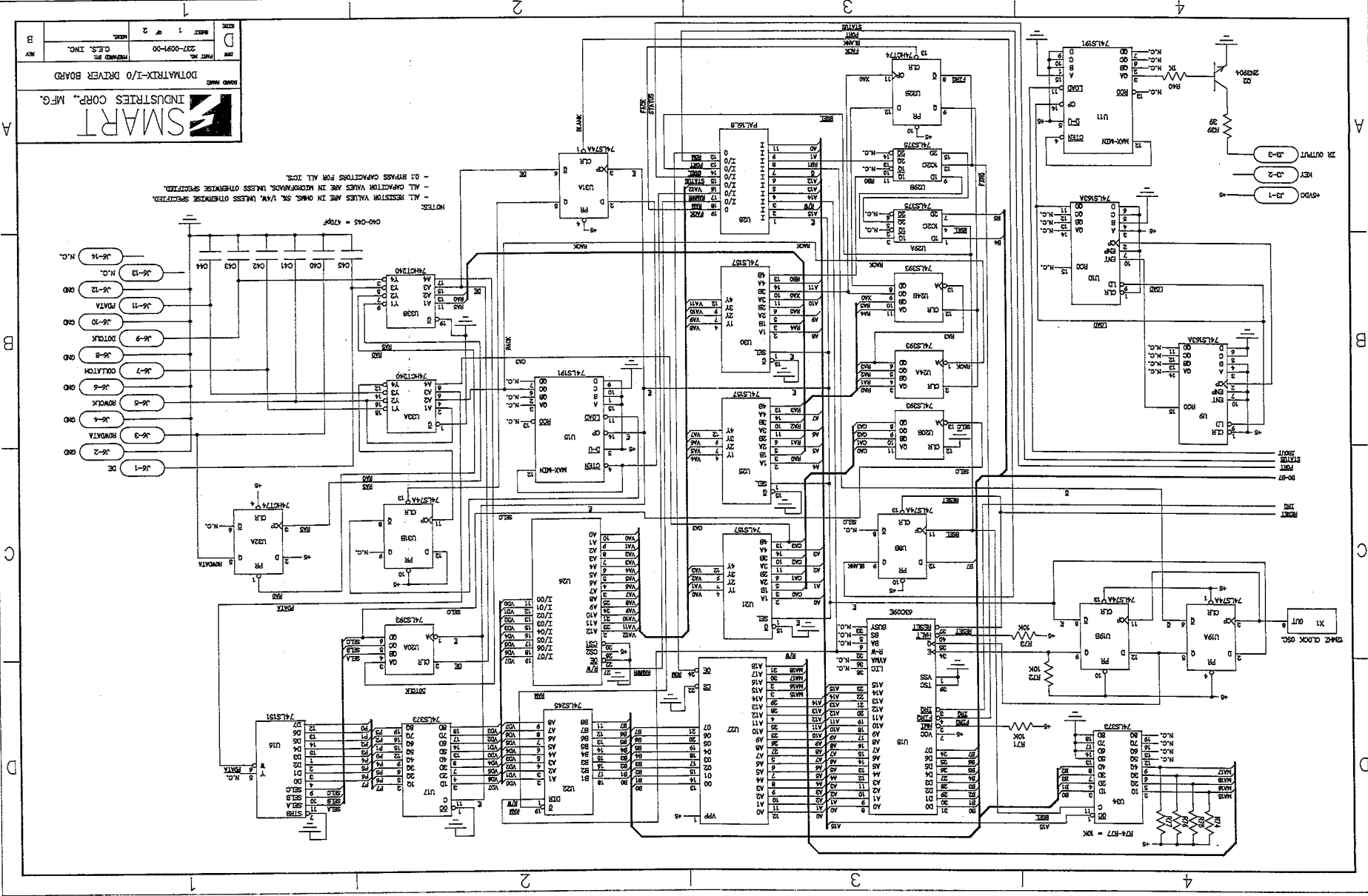
NOTE 1 - ALL RESISTOR VALUES ARE IN OHMS, VOLTS, OR UNLESS OTHERWISE SPECIFIED.
 - ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.

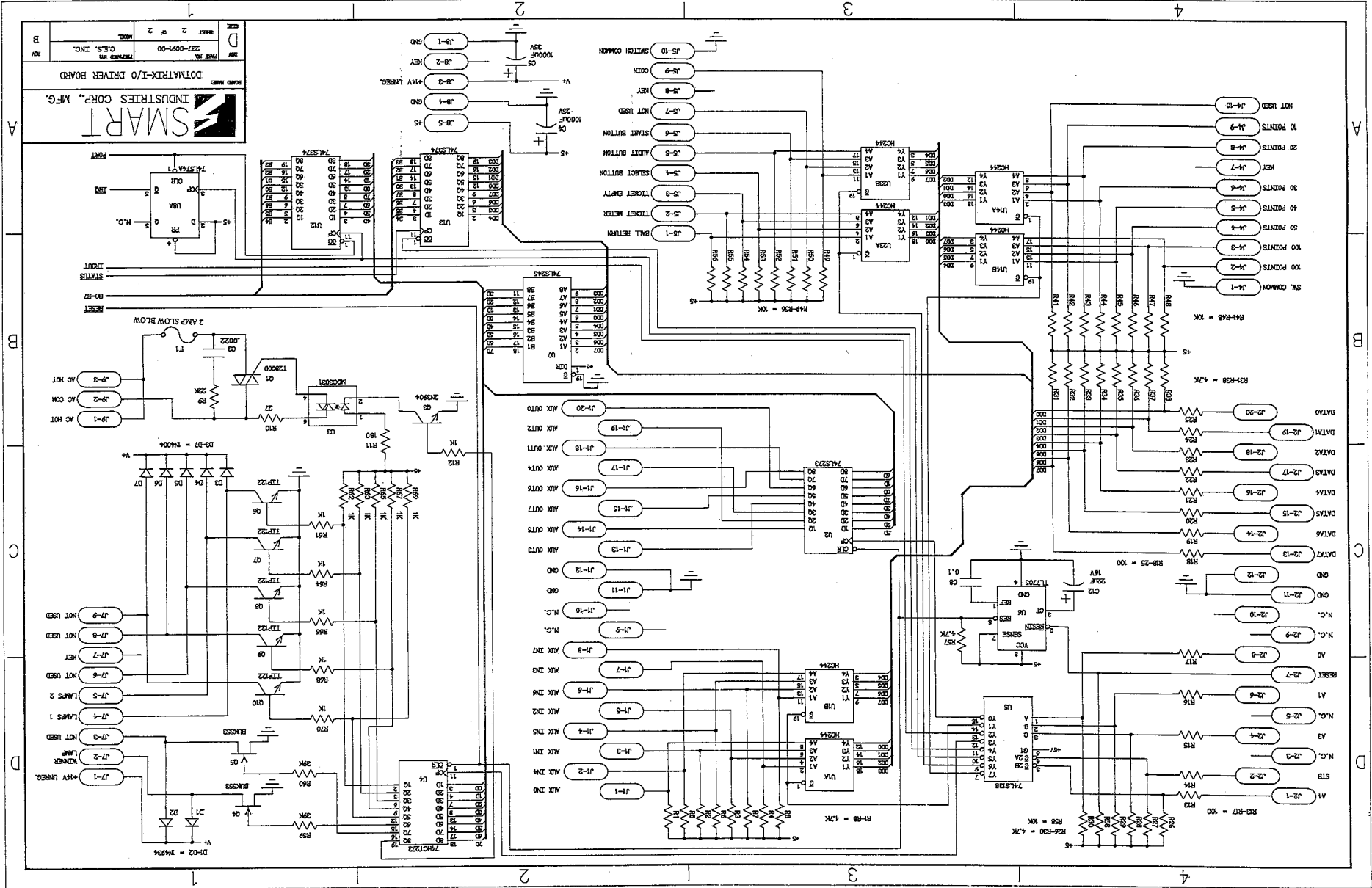


DRIVER I/O BOARD LAYOUT

5240







A

B

C

D

A

B

C

D

1

2

3

4

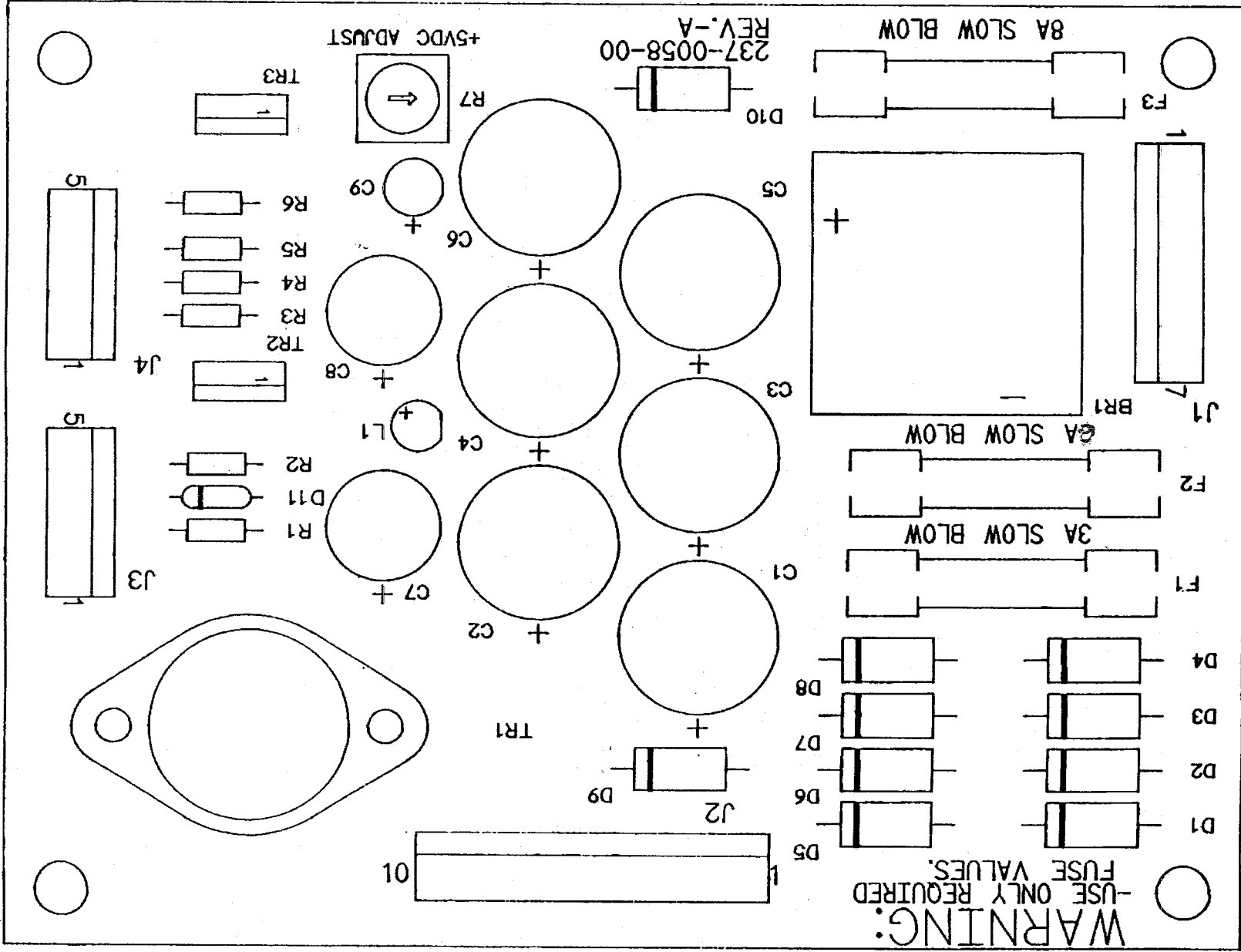
1

2

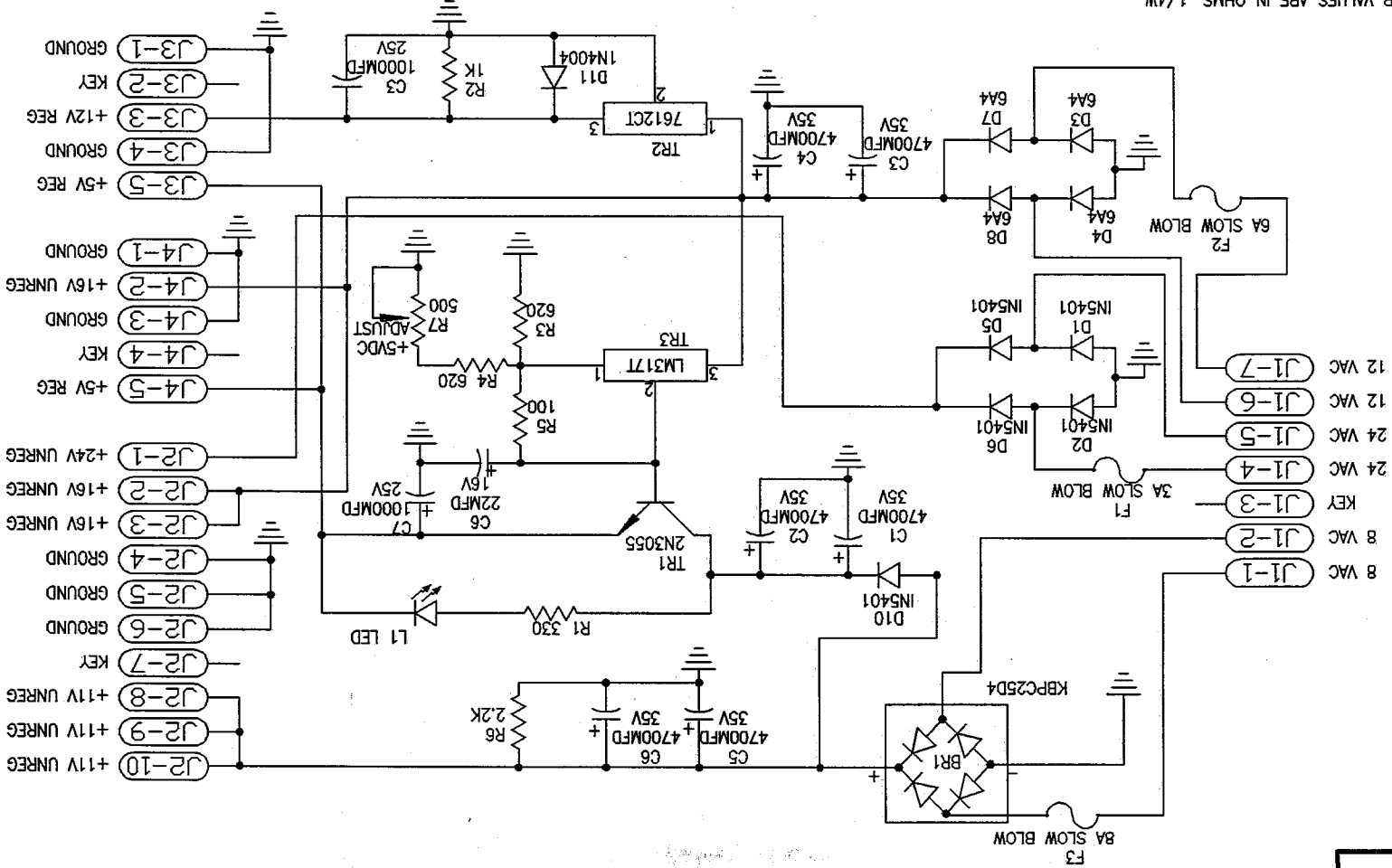
3

4

POWER SUPPLY BOARD



#5241



POWER SUPPLY BOARD - #5241

NOTES:
 -ALL RESISTOR VALUES ARE IN OHMS, 1/4W,
 5%, UNLESS OTHERWISE SPECIFIED.
 -ALL CAPACITOR VALUES ARE IN MICROFARADS,
 UNLESS OTHERWISE SPECIFIED.
 -D10 NOT USED.

UNLESS OTHERWISE SPEC.
 ALL DIMENSIONS IN INCHES
 TOL: FRACTIONAL 1/32
 ANGULAR, 1 DEG
 DECIMAL: .XX .03
 .XXX .010

SMART IND. CORP., MFG.
 1626 DELAWARE AVE.
 DES MOINES, IOWA 50317

THIS DRAWING IS THE EXCLUSIVE PROPERTY OF SMART IND.

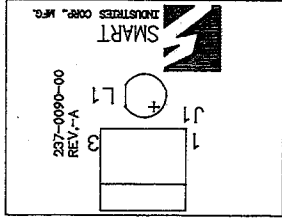
DD NOT SCALE THIS PRINT
 TITLE POWER SUPPLY BOARD
 SMARTBALL

APRVD						
CHK						
DRAWN	GRAY	4/7/93				

REV	DATE	EC#	CHANGE	BY	CHK

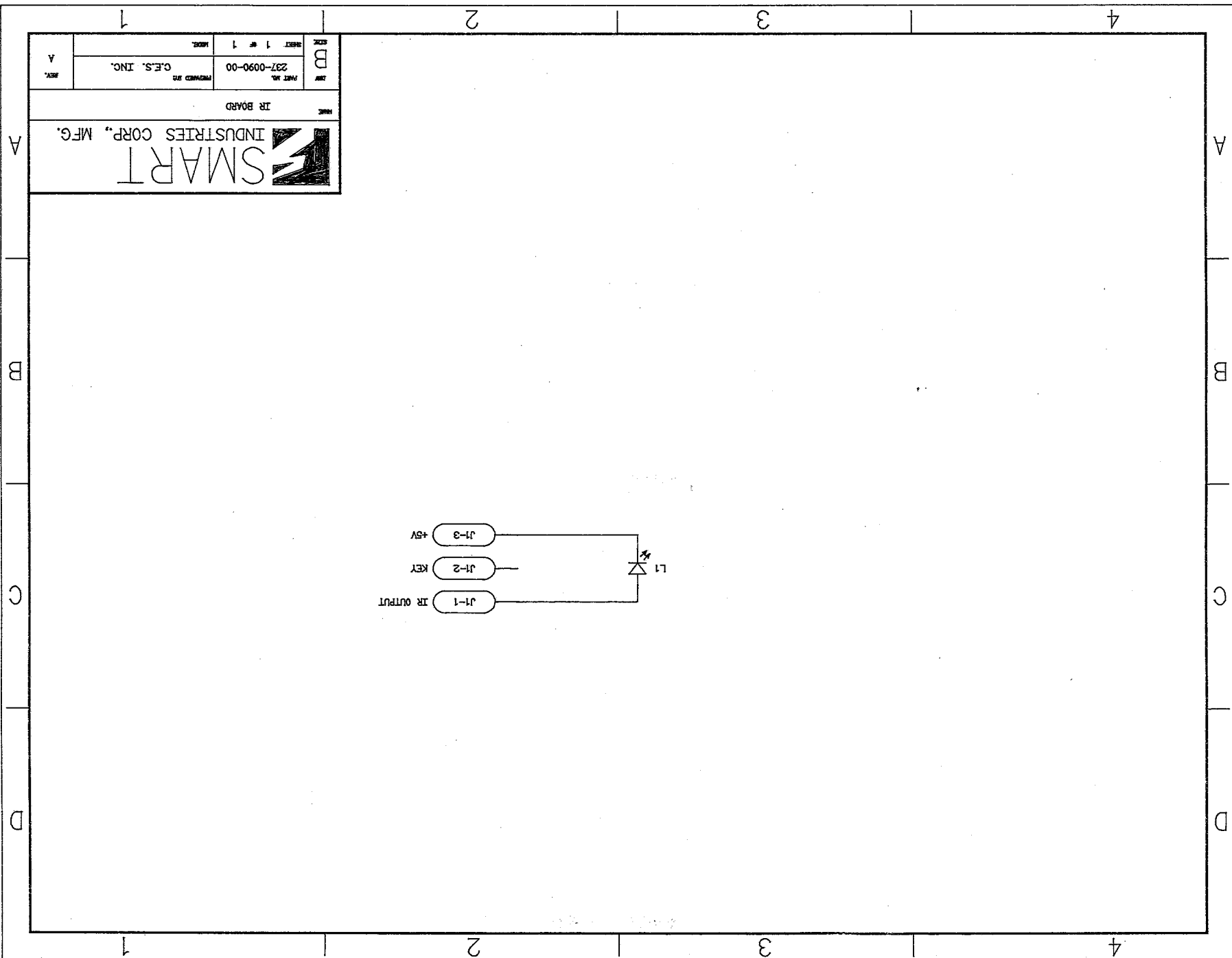
SIZE	A	SHT	DF	SCALE	NONE	DWG. NO.	5241
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INFRARED BOARD LAYOUT-#5258



INFRARED BOARD SCHEMATIC

#5258



REV. A		REV. B	
G.E.S. INC.		237-0090-00	
PART NO.		PROJECT 1 of 1	
IR BOARD			
INDUSTRIES CORP., MFG.		SMART	

AREA	1	2	3	4	5	6	7
LOGIC							

PART NO.	INTL CODE

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVED

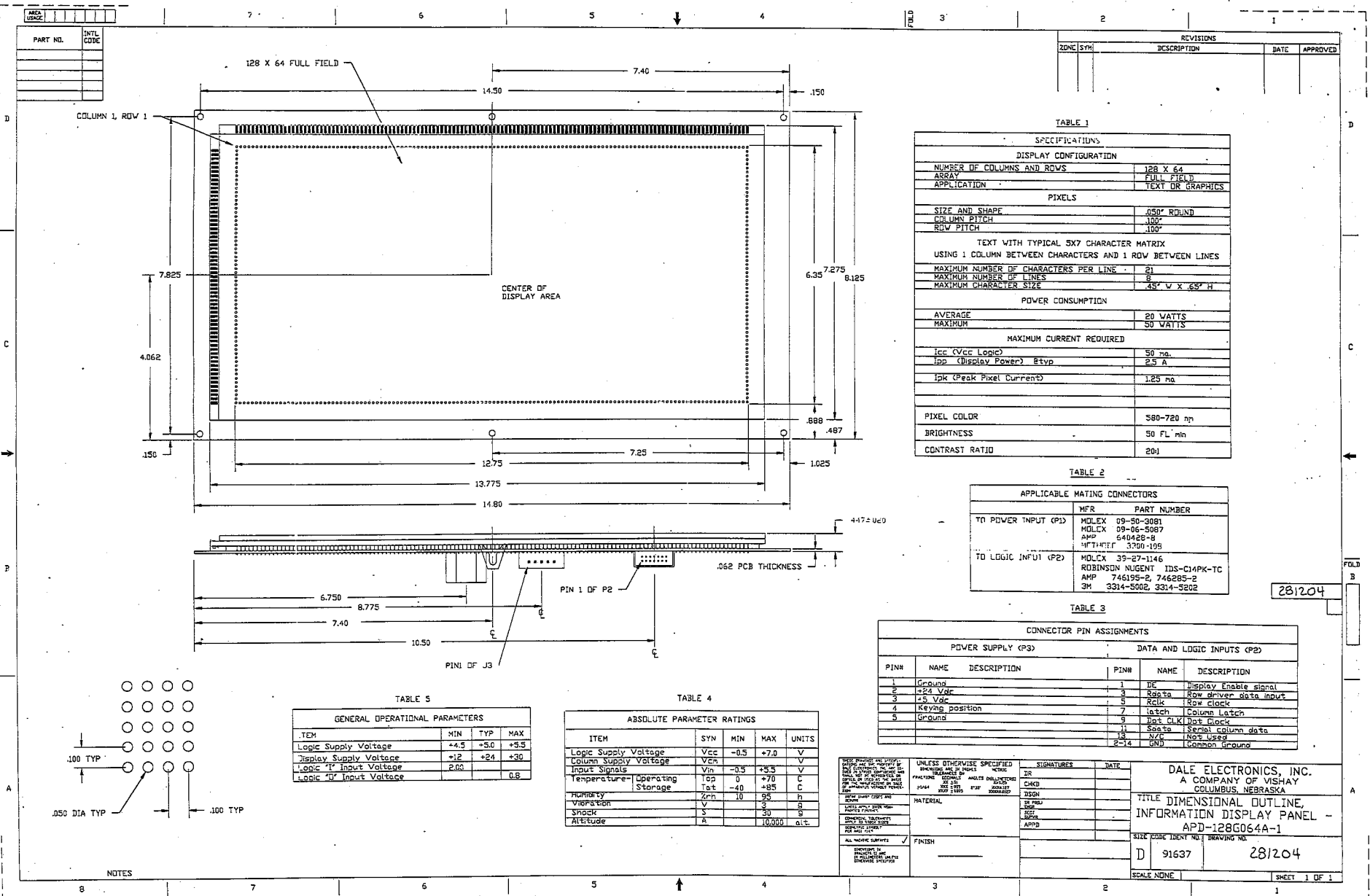


TABLE 1

SPECIFICATIONS	
DISPLAY CONFIGURATION	
NUMBER OF COLUMNS AND ROWS	128 X 64
ARRAY	FULL FIELD
APPLICATION	TEXT OR GRAPHICS
PIXELS	
SIZE AND SHAPE	.090" ROUND
COLUMN PITCH	.100"
ROW PITCH	.100"
TEXT WITH TYPICAL 5X7 CHARACTER MATRIX USING 1 COLUMN BETWEEN CHARACTERS AND 1 ROW BETWEEN LINES	
MAXIMUM NUMBER OF CHARACTERS PER LINE	21
MAXIMUM NUMBER OF LINES	8
MAXIMUM CHARACTER SIZE	.45" W X .65" H
POWER CONSUMPTION	
AVERAGE	20 WATTS
MAXIMUM	50 WATTS
MAXIMUM CURRENT REQUIRED	
I _{cc} (V _{cc} Logic)	50 ma
I _{pp} (Display Power) E _{typ}	2.5 A
I _{pk} (Peak Pixel Current)	1.25 ma
PIXEL COLOR	
	580-720 nm
BRIGHTNESS	
	50 FL/min
CONTRAST RATIO	
	20:1

TABLE 2

APPLICABLE MATING CONNECTORS		
TO	MFR	PART NUMBER
TO POWER INPUT (P1)	MOLEX	09-50-3081
	MOLEX	09-06-5087
	AMP	54042B-B
	MTHETF	3700-109
TO LOGIC INPUT (P2)	MOLEX	35-27-1146
	ROBINSON NUGENT	IDS-C14PK-TC
	AMP	746195-2, 746205-2
	3M	3314-5002, 3314-5202

TABLE 3

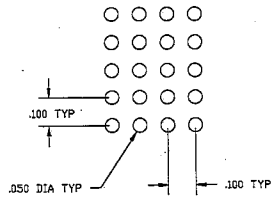
CONNECTOR PIN ASSIGNMENTS					
POWER SUPPLY (P3)			DATA AND LOGIC INPUTS (P2)		
PIN#	NAME	DESCRIPTION	PIN#	NAME	DESCRIPTION
1	Ground		1	DE	Display Enable signal
2	+5 V _{cc}		3	RDATA	Row driver data input
3	+5 V _{cc}		5	CLK	Row clock
4	Keying position		7	LATCH	Column Latch
5	Ground		9	Dot CLK	Dot clock
			11	SDATA	Serial column data
			16	NOV USER	
			2-14	GNV	Common Ground

TABLE 5

GENERAL OPERATIONAL PARAMETERS				
ITEM	MIN	TYP	MAX	
Logic Supply Voltage	+4.5	+5.0	+5.5	
Display Supply Voltage	+12	+24	+30	
Logic "I" Input Voltage	2.0			
Logic "D" Input Voltage			0.8	

TABLE 4

ABSOLUTE PARAMETER RATINGS					
ITEM	SYM	MIN	MAX	UNITS	
Logic Supply Voltage	V _{cc}	-0.5	+7.0	V	
Column Supply Voltage	V _{cn}		+7.0	V	
Input Signals	V _{in}	-0.5	+5.5	V	
Temperature - Operating	T _{op}	0	+70	C	
Storage	T _{st}	-40	+85	C	
Humidity	Z _{rh}	10	95	%	
Vibration	V			g	
Shock	S		30	g	
Altitude	A		10,000	ft.	



UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
FRACIONS DECIMALS ANGLES DIMENSIONS SHALL BE IN INCHES UNLESS OTHERWISE SPECIFIED	CHKD	
2004 22 JUN 2007 1200 2007 2007 2007 2007	DSGN	
MATERIAL	DR PRG	
	DRG	
	APPD	

DALE ELECTRONICS, INC.
A COMPANY OF VISHAY
COLUMBUS, NEBRASKA

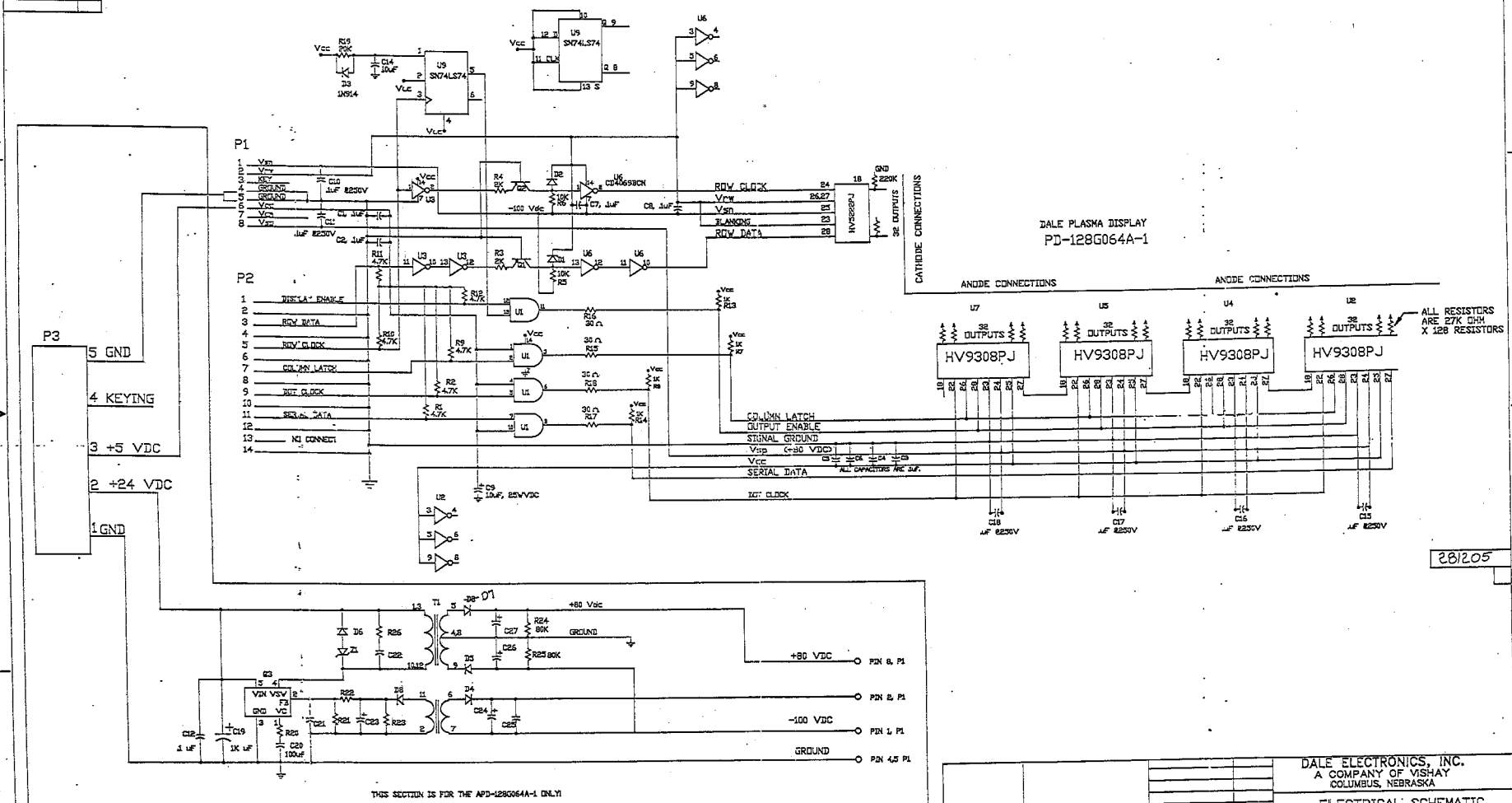
TITLE DIMENSIONAL OUTLINE,
INFORMATION DISPLAY PANEL -
APD-128G064A-1

SIZE CODE IDENT NO. DRAWING NO.
D 91637 281204

SCALE NONE SHEET 1 OF 1

281204

PART NO.	INTL CODE
	S



THIS SECTION IS FOR THE APD-128G064A-1 ONLY

281205

DALE ELECTRONICS, INC. A COMPANY OF VISHAY COLUMBUS, NEBRASKA	
ELECTRICAL SCHEMATIC APD-128G064A / -1	
D 91637	281205
SCALE NONE	SHEET 1 OF 1

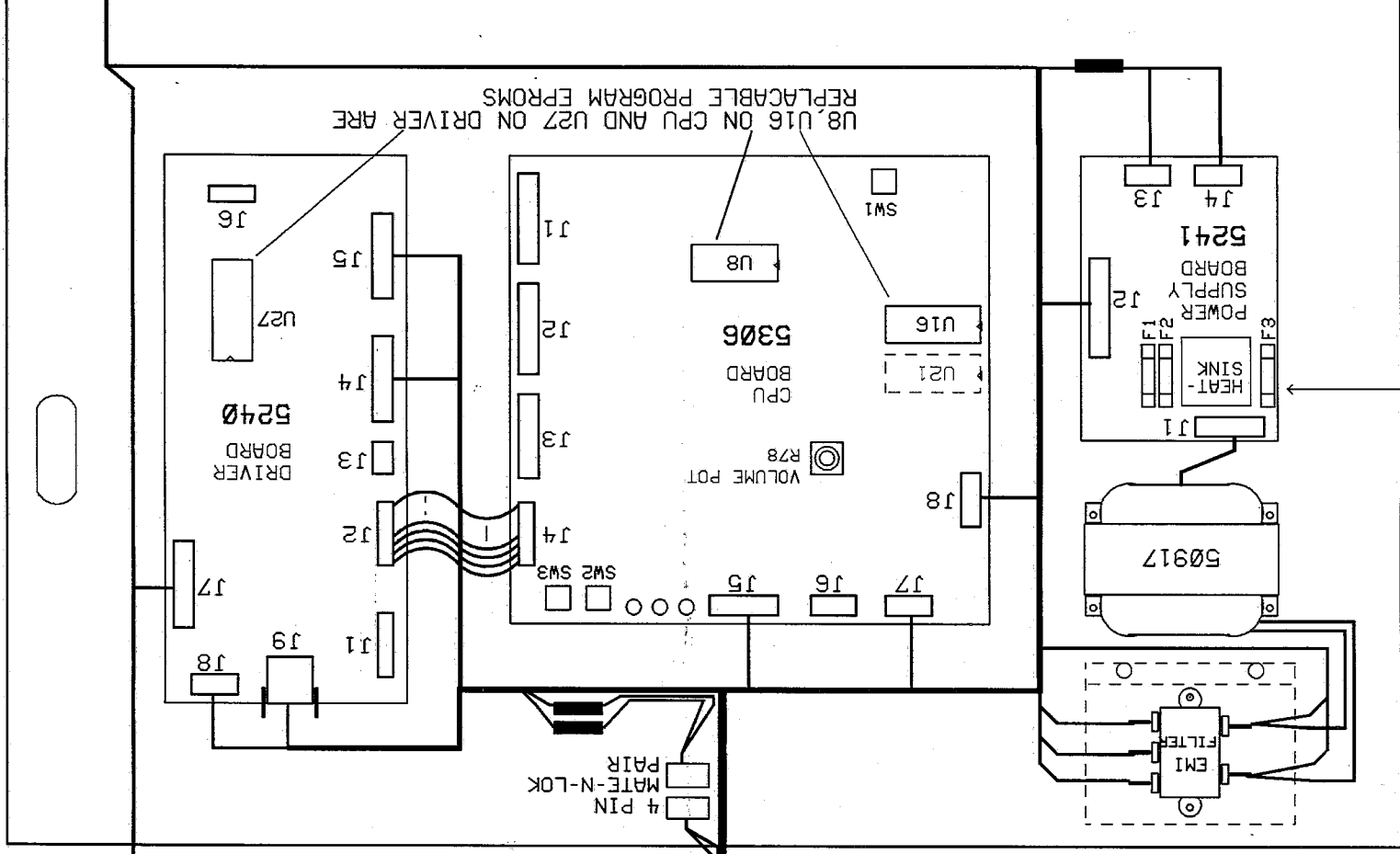
NOTES

5328

THESE 8 CONNECTORS MATE WITH CONSOLE INTERCONNECT CABLES

2 PIN MATE-N-LOK FEMALE
 CTO WINNER LIGHT)

4 PIN MATE-N-LOK PAIR



SMARTBALL - COMPONENT BOARD (#5328) LAYOUT

CTO MARQUEE LIGHTS)
 4 PIN MATE-N-LOK FEMALE

5 PIN KK

DATE	SBX-COMP
1/13/93	
SMARTBALL	
REV #:	
A	
SMARTBALL	
REV #:	
A	
SMARTBALL	
DATE	
1/13/93	
SBX-COMP	

(TO DISPLAY P3)

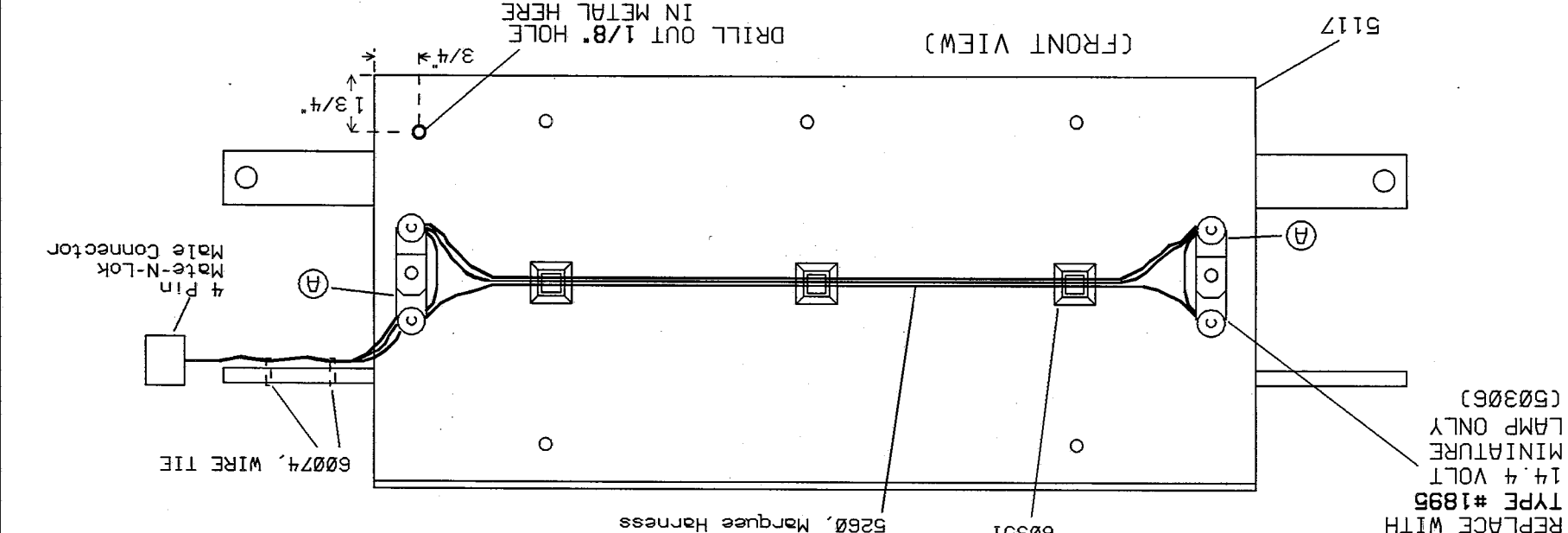
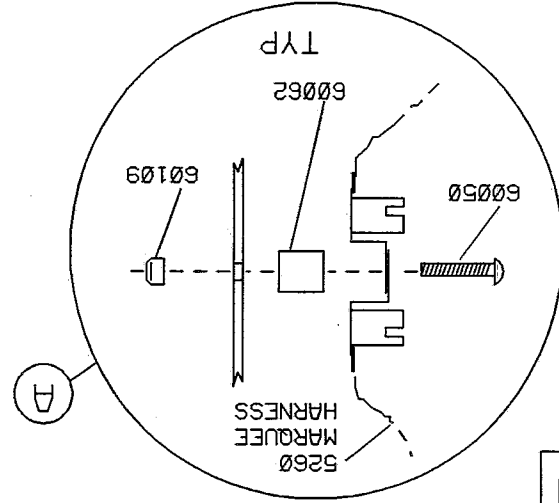
DESCRIPTION

ITEM	QTY	P/N
1	1	5117
2	1	5260
3	3	60351
4	1	60315
5	5	60653
6	5	60091
7	5	60051
8	8	60109
9	2	60062
10	2	60050
11	3	60057
12	2	60074
13	1	5119
14	1	60110

SCREW, 4-40x1/2"
 PCB ASSY, GAS PLASMA
 TIE, WIRE, 7.5" NYL
 TIE, WIRE, 4.0" NYL
 SCREW, 4-40x3/4"
 STANDOFF, NYL, 1/2"
 NUT, 4-40, NYL INSERT
 SCREW, 4-40x1 1/2"
 STANDOFF, RUBB, 3/8"
 STANDOFF, NYL, 1"
 CLIP, CABLE, 1/2x3/4"
 CLIP, TIE, ADHESIVE
 ASSY, HARNESS, MARQUEE
 WELDMENT, DISPLAY, SBALL

5319

REPLACE WITH
 TYPE #1895
 14.4 VOLT
 MINIATURE
 LAMP ONLY
 (50306)



SMARTBALL - MARQUEE METAL BACK ASSEMBLY
 (FRONT VIEW)
 5117
 DRILL OUT 1/8" HOLE
 IN METAL HERE
 3/4"
 1 3/4"
 4 Pin Mate-N-Lok
 Male Connector
 60074, WIRE TIE
 5260, Marquee Harness
 60351
 5117

5319

DATE 1/14/93
 DRAW BY: RP
 SB-MAR01
 GAME SMARTBALL
 REV # A
 SMART INDUSTRIES

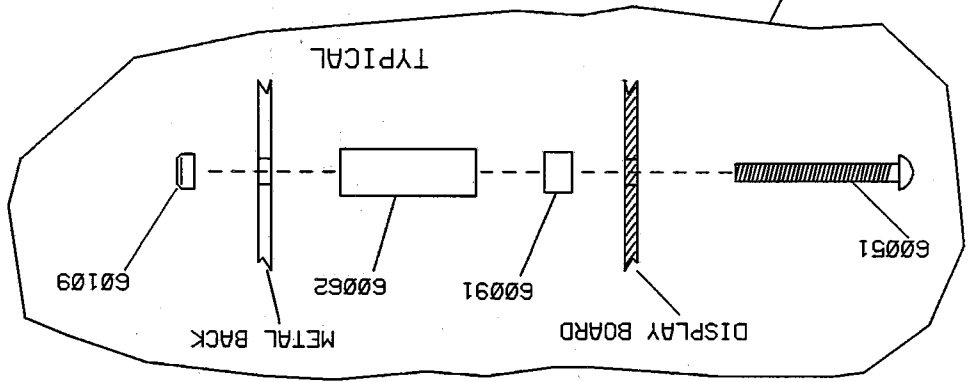
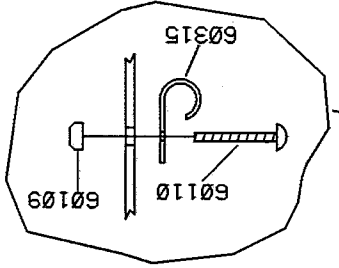
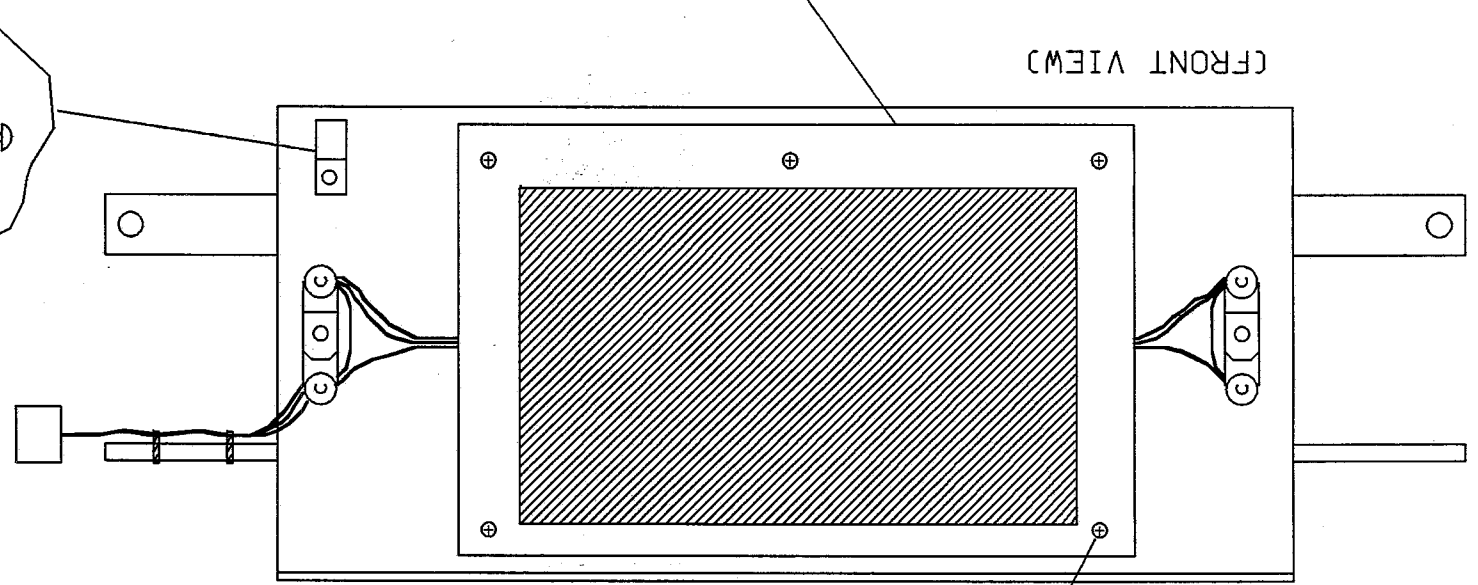
DWG 1 OF 2

DATE: 1/14/93	DWG 2 OF 2
GAME: SMARTBALL	sbx-mrq
REV #: A	
SMART INDUSTRIES	

5319

5119, GAS PLASMA DISPLAY BOARD

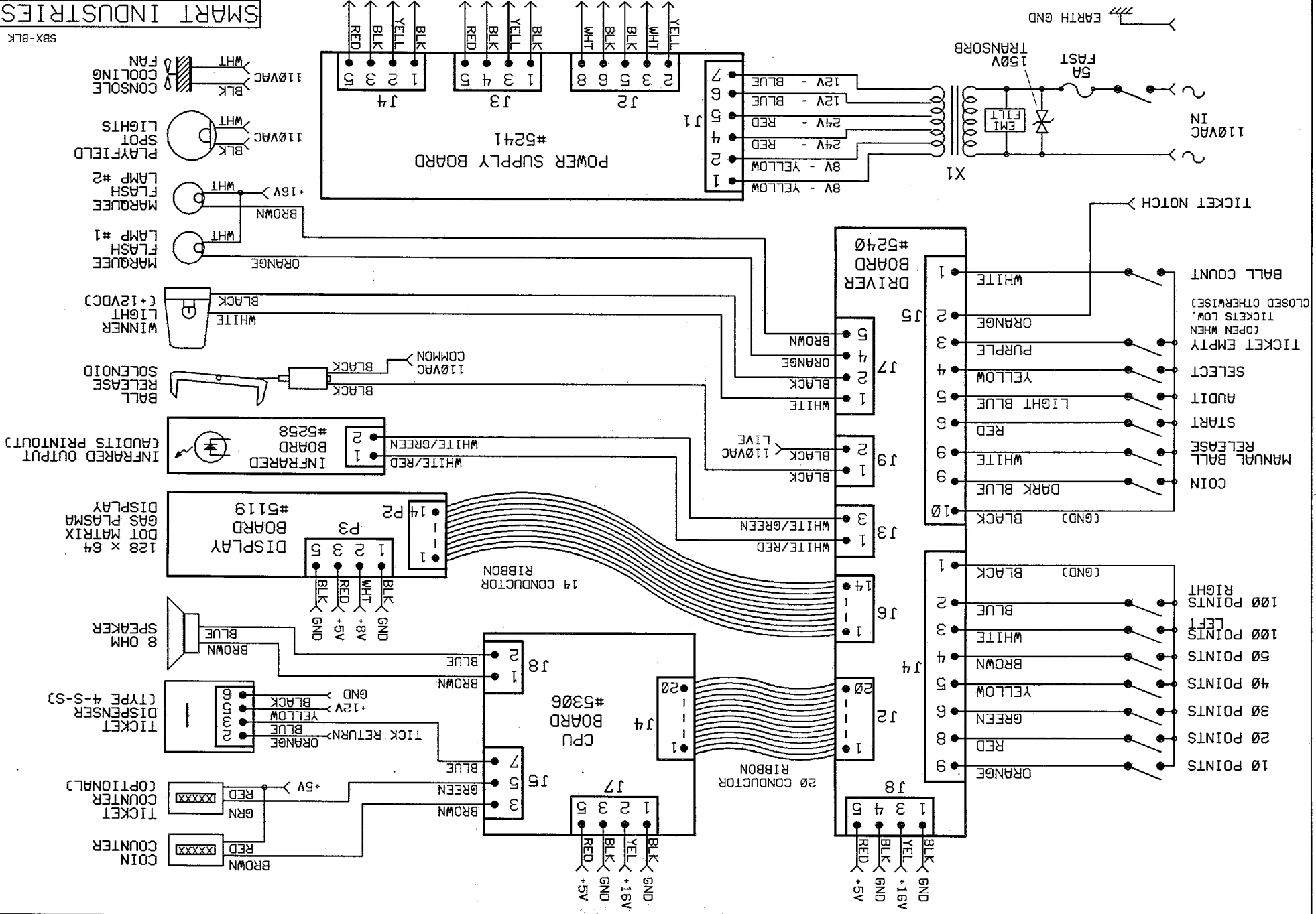
(FRONT VIEW)



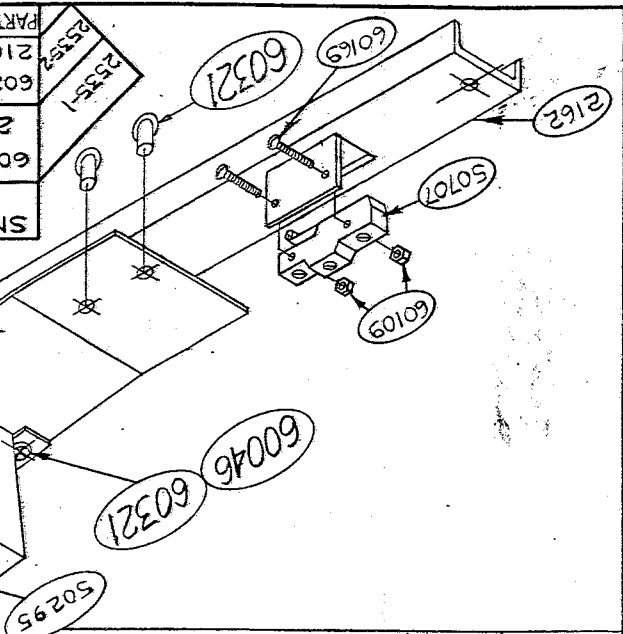
5319

SMARTBALL BLOCK WIRING DIAGRAM

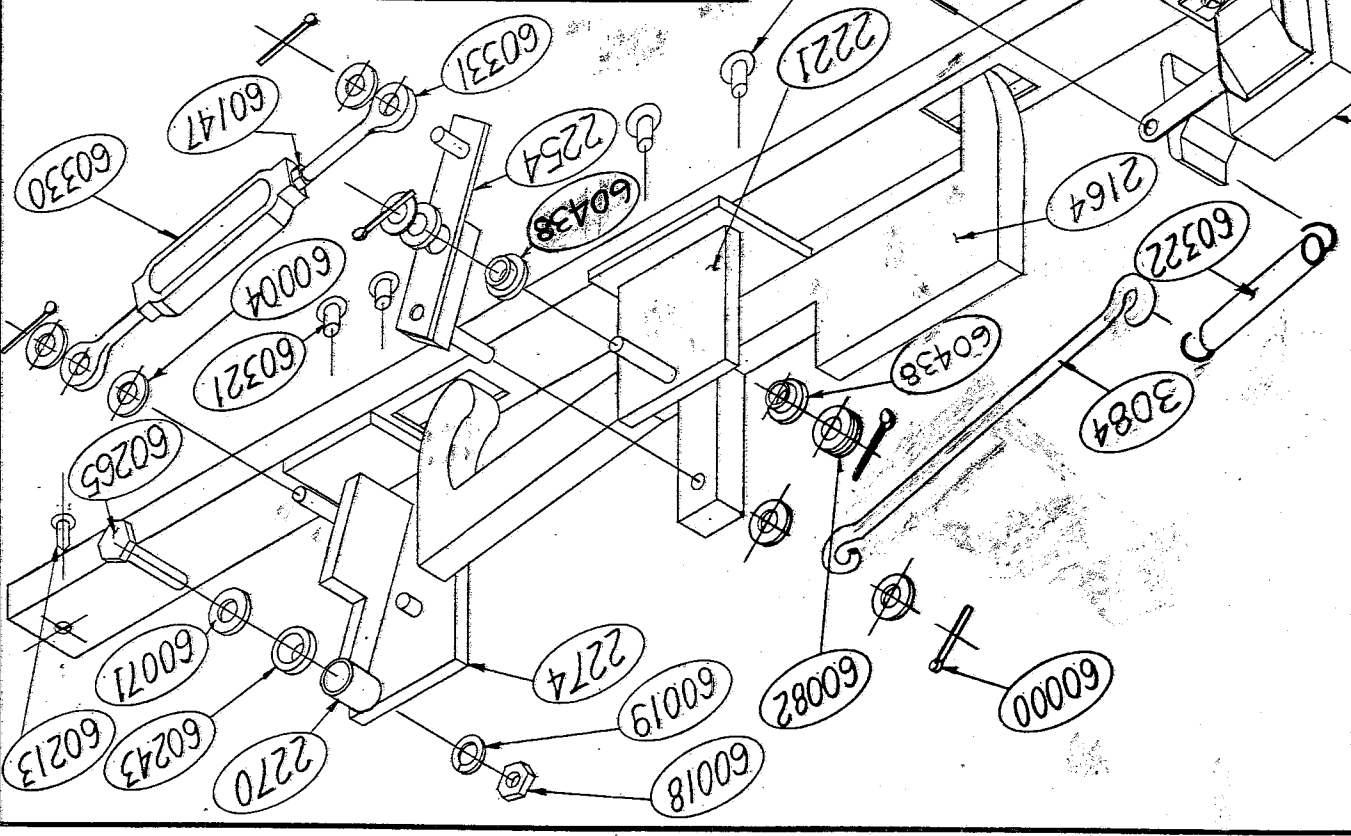
DATE 6/17/93
 DRAW BY RP
 GAME SMARTBALL
 REV # C
 SMART INDUSTRIES
 SBX-BLK



PART NO.	QTY.	DESCRIPTION
50295	1	SOLENOID 110 VAC
2274	1	BALL RELEASE LOCK ASS'Y.
60001	1	1/8 x 1 1/2 COTTER KEY
60322	1	3/8 x 3/4 SPRING
2221	1	BALL RELEASE PIVOT ASS'Y.
60320	2	1/4-28 x 3/8 PHIL. PAN HD. M.S.
2164	1	BALL RELEASE
60438	4	BRASS BUSHING
60082	4	3/8 FLAT WASHER
60000	5	1/16 x 3/4 COTTER KEY
2254	1	CONNECT ARM ASS'Y.
3084	1	ROCKER PIVOT ROD
2157	1	SOLENOID BRACKET
60321	8	No. 10-32 x 3/8
60046	8	PHIL. PAN HD. M.S.
50707	1	SWITCH MICRO RALTER BZ-2RW82A2
60169	2	4-40 x 1 MACH. SCREW
60109	2	4-40 NYLOCK NUT



PART NO.	10' QTY.	B' QTY.	DESCRIPTION
2162	-	1	SMART BALL RAIL
60213	-	5	No. 8 x 3/4 PHIL. P. HD. P.B.S.
2163	1	-	SMART BALL RAIL
60213	4	-	No. 8 x 3/4 PHIL. P. HD. P.B.S.
			RELEASE ASSEMBLY
			SMART BALL-10 FT & 13 FT BALL

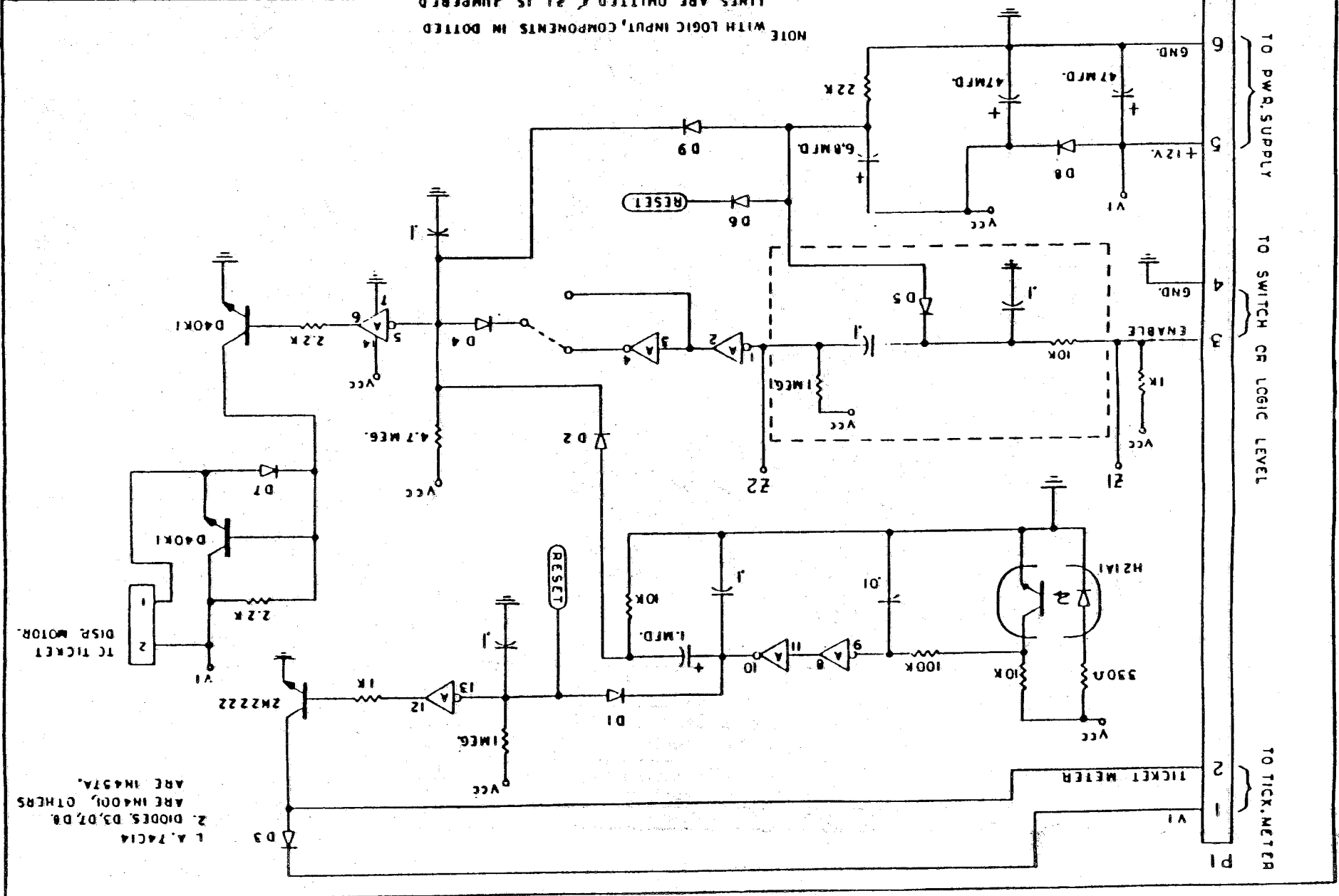


PART NO.	QTY.	DESCRIPTION
60004	5	5/16 FLAT WASHER
60147	1	No. 10-24 HEX. LOCK NUT
60331	1	EYE BOLT 10-24 x 3 1/2
60330	1	TURN BUCKLE
60018	1	1/4-20 HEX. NUT
60019	1	1/4 SPLIT WASHER
60071	1	1/4 FLAT WASHER
60243	1	BRASS BUSHING
2270	1	BALL RELEASE STOP ASS'Y.
60265	1	1/4-20 x 1 1/4 HEX. HD. M.S.

SMART IND. CORP., MFG.
 1626 Delaware Ave.
 Des Moines, Iowa 50317

DWG. NO. 2535

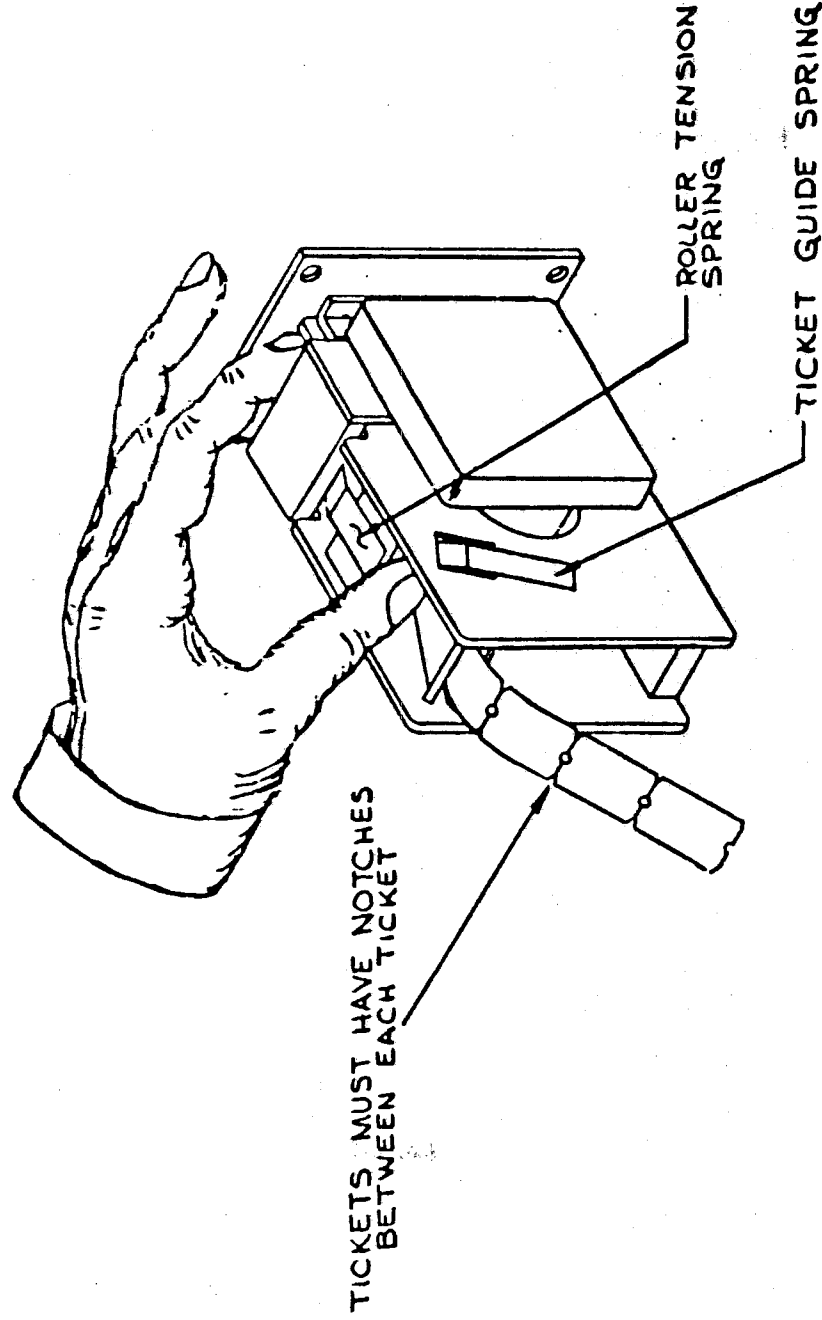
DELTRONIC LABS INC.
 12-28-73
 TM-4 TICK. DISP. BOARD
 ONE PULSE ONE TICK. 122983



NOTE WITH LOGIC INPUT COMPONENTS IN DOTTED LINES ARE OMITTED & Z1 IS JUMPED TO Z2.

1. A. 7AC14
 Z. DIODES. D3, D7, D8
 ARE 1N4001, OTHERS
 ARE 1N457A.

1 TC TICKET
 2 DISP. MOTOR.



TICKET LOADING DIRECTIONS:

1. ENTER TICKETS AS INDICATED AND FEED TICKETS PAST THE TICKET GUIDE SPRING UNTIL THEY STOP.
2. PLACE FINGERS AS INDICATED AND SQUEEZE, THIS OPENS THE FEED ROLLERS.
3. FEED TICKETS UNTIL THE FIRST TICKET PROTRUDES APPROX. 1/16" BEYOND THE DISPATCH SLOT.
4. RELEASE ROLLERS, TICKET DISPENSER IS NOW LOADED AND READY FOR USE.

REPLACEMENT PARTS LIST FOR SMARTBALL

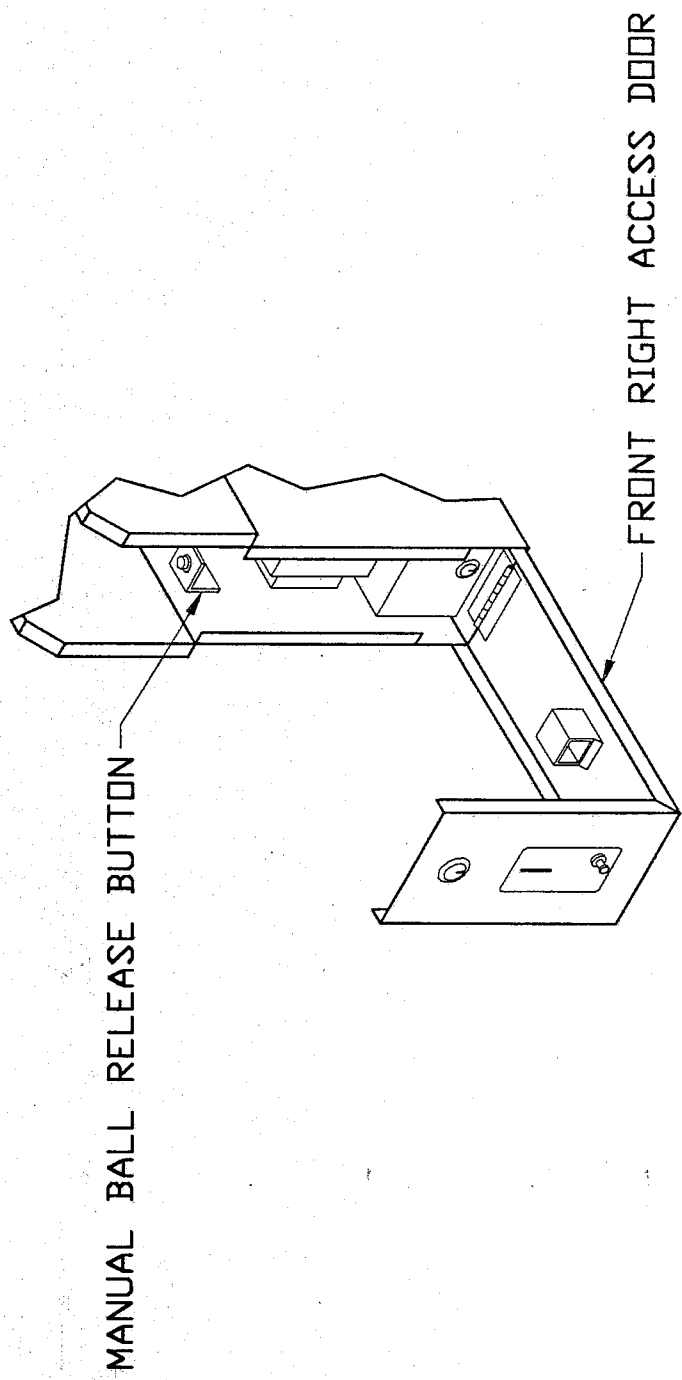
ASSY, COMPLETE COMPONENT BOARD	5328
ASSY, COMPLETE DISPLAY	5319
ASSY, COMPLETE PLAYFIELD	2756-02
ASSY, SIDE NET LH	2775-02
ASSY, SIDE NET RH	2775-01
ASSY, TOP NET	2510
BALL RELEASE LOCK	2274
BALL RELEASE PIVOT	2221
BALL RELEASE SOLENOID	50295
BALL RELEASE STOP	2270
BULB, 12V MINIATURE #1895	50306
BULB, FLOOD 50R20 (PLAYFIELD)	50939
BULB, FLUORESCENT 18" (MARQUEE)	50283
BUTTON AND SWITCH RED "START"	50930
BUTTON AND SWITCH YELLOW "SELECT"	50929
COIN BOX AND LOCK	5382
COIN MECH SLIDE ASSEMBLY	2111
CONNECTING ARM BALL RELEASE	2254
FIXTURE 18" FLUORESCENT	50708
LOCK FOR BACK ACCESS DOOR	60139
LOCK FOR FRONT STEEL DOORS	60142
LOCK FOR TICKET DISPENSER COVER	60141
MARQUEE WITH DECAL	5487
PCB ASSY INFRARED EMITTER BOARD	5258
PCB, ASSY DRIVER/CONTROLLER	5240
PCB, ASSY MAIN LOGIC PROCESSOR	5306
PCB, ASSY POWER SUPPLY	5241
POWER CORD	50067
ROCKER ARM WITH BUSHINGS	2165
SMARTBALL BALL 3" WOOD	60348
SMARTBALL LEG	2106
SMARTBALL MANUAL	2898
SWITCH, BONUS POCKET & BALL COUNT	50707
SWITCH, SCORING	50934
TICKET DISPENSER NARROW FACE	60304
WINNER LIGHT	50845

SUPPLEMENT

Manual Ball Release Feature

The **Smartball** unit is equipped with a Ball Release Switch. This feature allows the operator the convenience of releasing the balls, three at a time, for the purpose of keeping a count of the balls. This may be done at any time, during game play, or during attract mode.

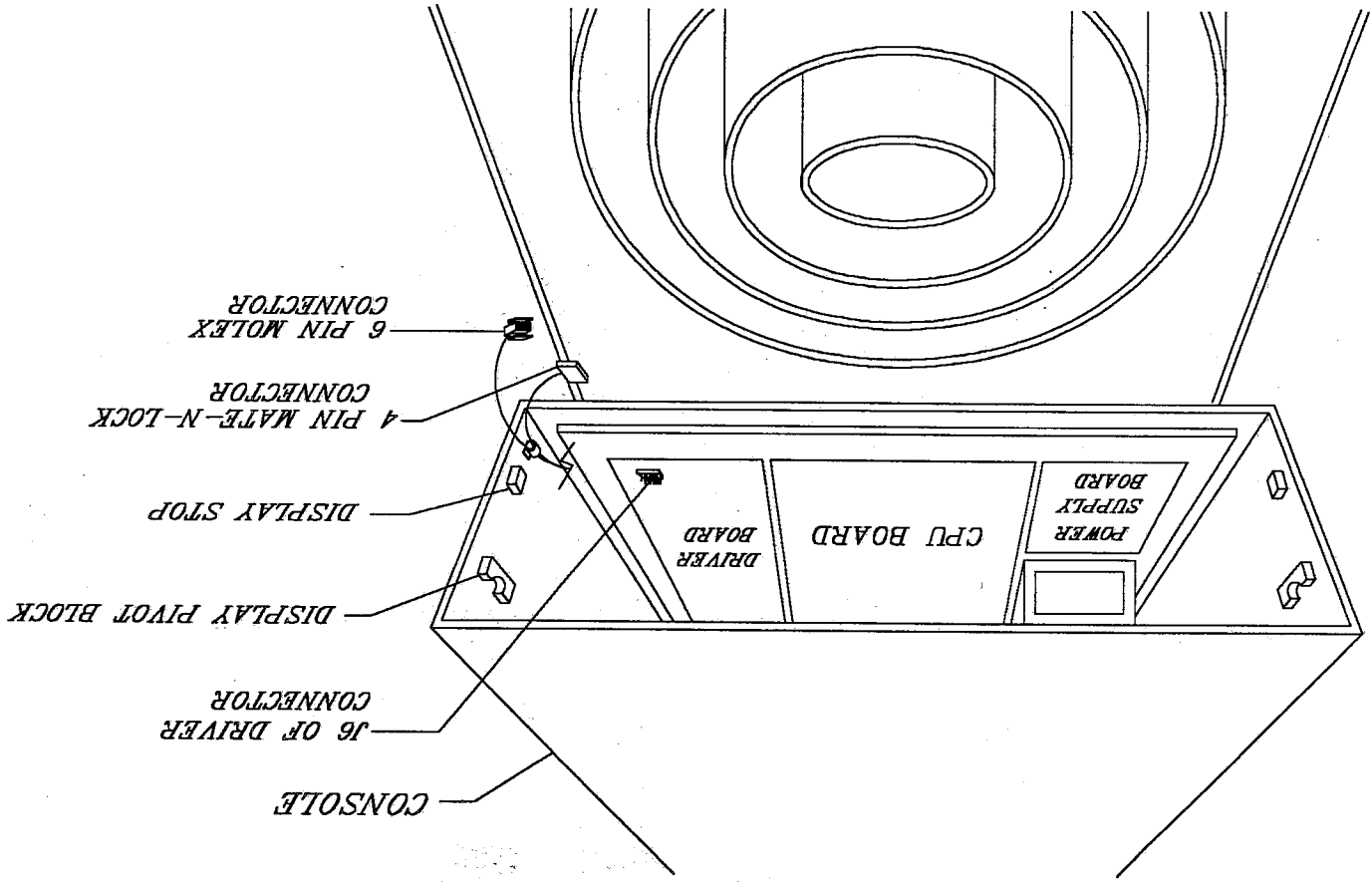
To release the balls, press the red switch located in the coin door (see below) until the solenoid kicks. Repeat until all balls are released.



Location of Ball Release Switch for manual ball release feature

**INSTRUCTIONS FOR ASSEMBLY
FOR SMART BALL DISPLAY
1 OF 4
5692**

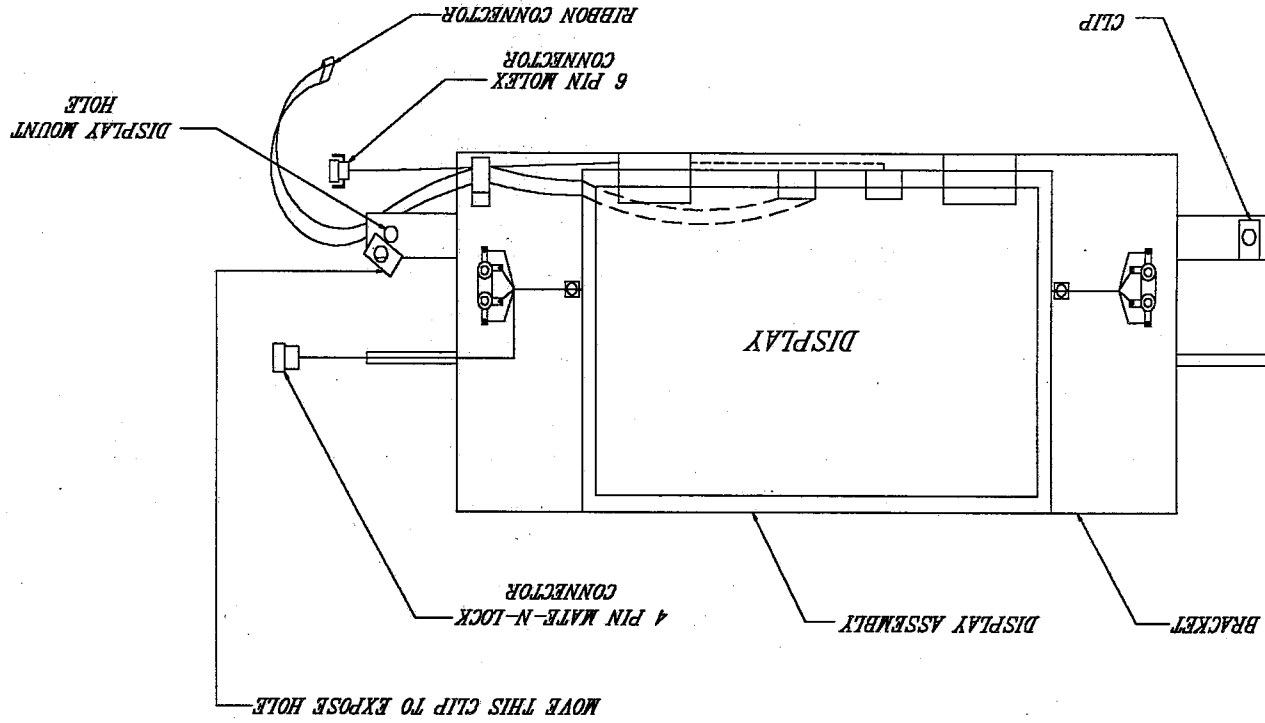
FIGURE 1



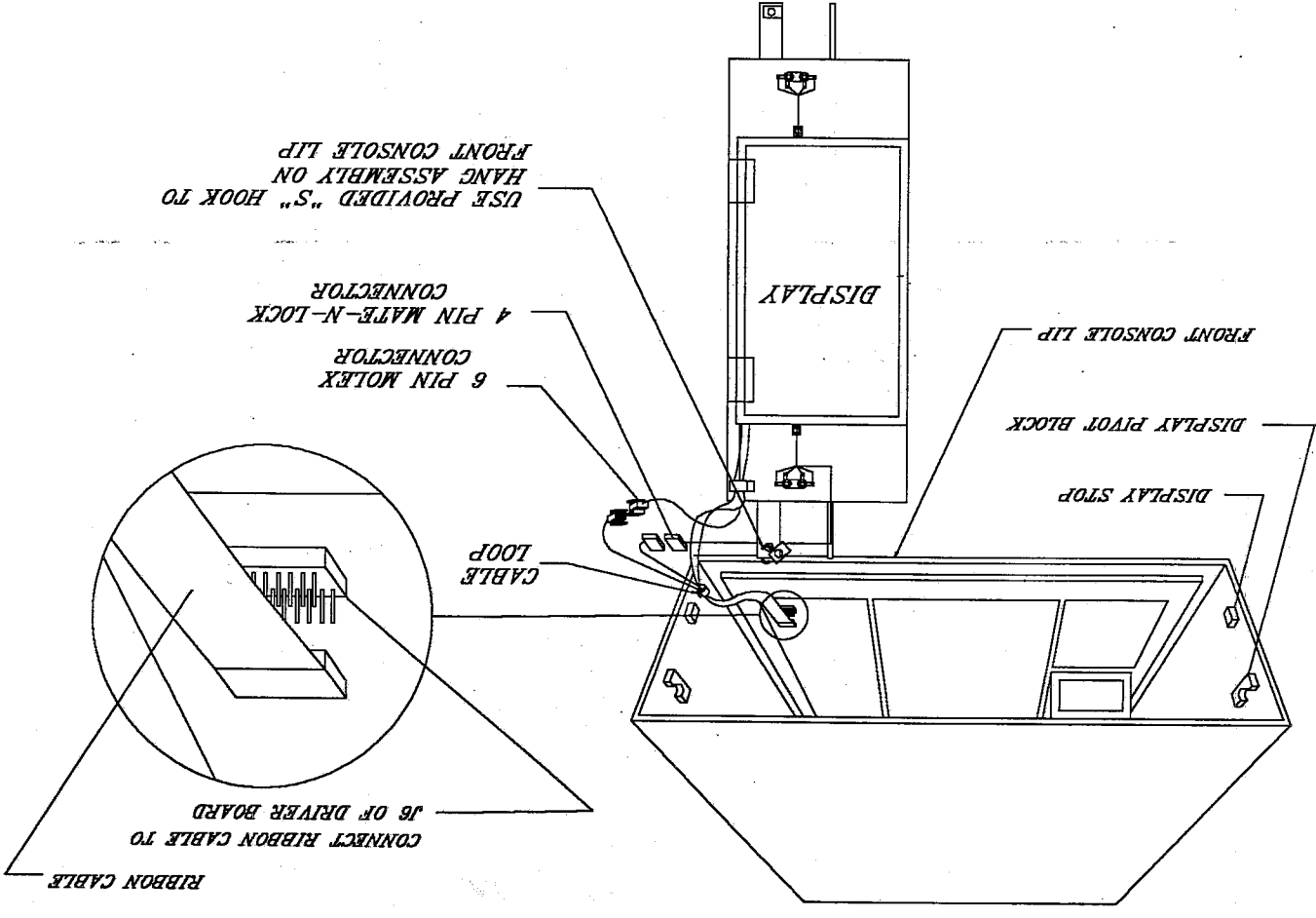
- STEP 1: MAKE SURE GAME IS OFF
- STEP 2: COMPLETE GAME ASSEMBLY AS SHOWN IN "ASSEMBLY INSTRUCTION" IN THE SMART BALL MANUAL.
- STEP 3: REMOVE MARQUEE
- STEP 4: LOCATE COMPONENTS SHOWN IN FIGURE 1 IN CONSOLE.

- STEP 5: REMOVE THE DISPLAY ASSEMBLY FROM ITS BOX.
 STEP 6: LOCATE THE DISPLAY CLIPS IN FIGURE ABOVE, AND MOVE OVER RIGHT SIDE CLIP TO EXPOSE DISPLAY MOUNT HOLE.
 STEP 7: IDENTIFY THE THREE CONNECTORS SHOWN, TO BE USED LATER.

FIGURE 2



2 OF 4



- STEP 8: USING THE "S" SHAPED HOOK PROVIDED IN THE DISPLAY ASSEMBLY BOX, HANG THE DISPLAY ON THE FRONT CONSOLE LIP AS SHOWN IN FIGURE ABOVE.
- STEP 9: FEED RIBBON CABLE THRU CABLE LOOP AND CONNECT AS SHOWN IN FIGURE ABOVE.
- STEP 10: CONNECT 4 PIN MATE-N-LOCK CONNECTORS AS SHOWN IN FIGURE ABOVE.
- STEP 11: CONNECT 6 PIN MOLEX CONNECTORS AS SHOWN IN FIGURE ABOVE.

FIGURE 3

3 OF 4

- STEP 12: REMOVE "S" SHAPE HOOK
- STEP 13: RETURN RIGHT SIDE CLIP TO ORIGINAL POSITION.
- STEP 14: PLACE DISPLAY SWIVEL ROD INTO DISPLAY PIVOT BLOCKS.
- STEP 15: SWIVEL DISPLAY SO THAT DISPLAY SECURE BRACKET IS AGAINST DISPLAY STOP.
- STEP 16: PLACE SCREW THRU CLIP AND DISPLAY STOP THUS SECURING DISPLAY.
- STEP 17: **CHECK** TO MAKE SURE THAT ALL CONNECTORS (4 PIN, 6 PIN AND RIBBON) ARE CONNECTED.
- STEP 18: THE GAME IS NOW READY TO BE TURNED ON.

FIGURE 4

