

CLEAN SWEEP CRANE TM

5th Generation

MANUAL

Jumbo



SMART

INDUSTRIES CORP. , **MFG.**

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Clean Sweep™ Manual

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WARNING:

SHOCK HAZARD

connect this game only to a grounded 3 wire outlet . If you have only a 2 wire outlet, we recommend you hire a licensed electrician to install a grounded outlet. Players may receive an electric shock if this game is not properly grounded!

GAME INSPECTION

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

NOTE:

Do not plug game in yet:

1. Examine the exterior of the game cabinet for dents, chips, or broken parts.
2. Unlock and open the coin door, inspect the interior of the game as follows:

Check that all plug-in connectors (on the game harness) are firmly seated. Replug any connectors found unplugged. Don't force connectors together the connectors are keyed so they only go on in the proper orientation. A reversed edge connector will damage a PCB and will void your warranty. Check that all plug-in integrated circuits on the game PCB are firmly seated in their sockets. Remove power cord from inside coin door. Check the cord for any cuts or dents in the insulation.

3. Remove all wire ties installed to restrain crane head from movement during shipping. Performance through visual inspection of crane head assembly for any signs of damage.

INSTALLATION

1. Location
Power
Domestic 110 V @ 60 Hz
Temperature: 32° to 100°F (0° to 38°C)
Humidity: Not over 95% relative

REGULATIONS - YOUR RESPONSIBILITY

Your game has been carefully designed and manufactured.

Our factory is capable of designing unique features or controls should your jurisdiction regulations require it.

The set-up and the daily operation of your game greatly influence the legal acceptance of your on-location crane business.

Your responsibilities include:

1. Not to alter or tamper with any factory setting, circuitry, or programs without factory authorization. Doing so will nullify and void your warranty and may be criminal.
2. Ascertaining that each and every prize **you** place in game's playfield can be retrieved and won by a player. (Consider that some prizes can be too small, large, or heavy).
3. The machine. **must** be **checked frequently** to **insure** that the prizes are **not** pocked, restricted, or inaccessible to a player. If a prize cannot be -retrieved by a skillful player in a reasonable amount of attempts, **DO NOT** place it within the game.
4. Checking with- **the** jurisdiction authorities where **you** are operating, as to **any** required business license, game license, or regulation-s. (You **may** **also** do this through your business legal advisor).
5. Inspect your game daily to ascertain all mechanisms are properly functioning. All decals and signs are posted, and your prizes are well stocked. This will increase your play.
6. Your fair consideration with the customers is **your** best long-term repeat business.

Theory of Operation

The gameboard is nothing more than a simple microprocessor base controller. The heart of the controller is the rockwell R6511AQ U13 Single chip microcomputer. The R6511AQ consists of the popular 6502 microprocessor, 192 bytes of RAM, two timers, and 32 programmable I/O lines all on one chip. The system clock is generated by an on-chip oscillator and an external 4MHZ crystal. The 4MHZ signal can be viewed with an oscilloscope on pin 45 of the R6511AQ. This should be a square wave with at least a 4 Volt peak. The program is stored in an external 27328 U14 Eprom. A15 on the microprocessor is inverted to enable the E-prom, the 2MHZ clock (pin 45) is inverted to enable and latch data from the E-Prom.

The DS1232 U17, is a microprocessor monitor and reset chip. Pin 34 on the microprocessor will strobe pin 7 of the micro monitor. If pin 7 of the micro monitor is not being strobed it will reset the microprocessor every 1.5 seconds.

The 74LS373 U15 is a Data latch for the two digit display, and 74LS00 is a nand gate used as an inverter.

There are two 8 positions DIP switches used to select game options (see enclosed settings). These switches are multiplexed and read through one 8 bit port (port B). The state of PD7 determines which switch is being read. At power up PD7 goes high and switch 2 is read. After the short pulse to S2, PD7 goes low, is inverted through U12, and S3 is read.

The coin meter is controlled by PA5, through U12, and Q8. One pulse is sent to the meter for every quarter and four pulse for every dollar (if bill acceptor is installed).

All the inputs are optically isolated from the logic using 4N25 optocouplers. When limit switch, coin mech switch, etc., closes, it forces current to flow through an infrared emitting diode inside the 4N25. There is a photo transistor in the package that receives this light and turns on, forcing the appropriate input on the R6511AQ to ground. These inputs are debounced with software, eliminating the need for debouncing hardware.

The three crane motors are controlled by port D, 6 2N222 transistors (Q1-OS), and 6 relays (K1-K6). Each motor has two relays associated with it: one to supply power and one to determine direction. C7-C9 are used to suppress arcing of the relay contacts, and R1-R3 are braking resistors to stop the motors when power is removed. The claw solenoid is controlled by port D, Q7 and K7. The strength of the claw can be adjusted by changing the position of R40. Which is a 100 ohm Potentiometer that will adjust claw voltage from approximately 33 volts D.C. to 68 volts D.C.

The 5 volt and 12 volt supplies for the game board are supplied from the HiTRON, model HSA-130-C switching power supply. The switching power supply protects the game board from loss of power due to low line voltage. The 5 volt supply provides the operating voltage for the complete logic system while the 12 volt supply provides the operating voltage for the relays, optoisolators, coin meter, coin mechanism lights and the CREDIT/TIMER display.

48 volts AC is supplied to bridge rectifier, D4. This supply is filtered with a 330 microfarad capacitor and is utilized to furnish all operating power to the crane head motors and the claw close solenoid. The measured output voltage will vary depending on the loading but will range from 50 to 70 volts.

TROUBLE-SHOOTING

Troubleshooting requires analyzing the complete system. The majority of problems will be traced to malfunctioning or misadjusted limit switches on the crane head assembly. There are four limit switches mounted on the crane head assembly. (For traceability we will refer to the item numbers used on the Crane Assembly drawing and parts list.) Switch 22 is the FRONT/BACK HOME LIMIT SWITCH. The actuating arm of this switch should be formed to the position where it lays parallel to the face of the STOP SWITCH ACTUATOR (27A) while "just not" touching the actuator. This will permit operation of the switch when the STOP ROD PLUNGER (27) is depressed approximately 5/16 inch. If greater than 5/16" depression of the stop rod is required to operate the switch, the bouncing action of the trolley on the front bumper may cause logic problems. Switch 25 is the LEFT/RIGHT HOME LIMIT SWITCH. Proper adjustment of this switch provides for it's operation when the crane is approximately 5/32 inch from the STOP BUMPER (28). This adjustment is not critical. Only requiring switch operation occurring early enough to assure motor turn off.

Refer to the drawing included in the MECHANICAL SET-UP PROCEDURES for clarity in the proper installation of the following switches. Switch 103 is the UP LIMIT SWITCH. This switch is in the 'closed' position while the claw is in the down position. When the claw is raised to it's upper position, the BRASS CABLE SLEEVE (74) is lifted. At approximately 1/4 inch lift, switch 103 will transfer to the "open" condition. It is this transfer of state the microprocessor senses. When the microprocessor senses this transfer, the lifting motor will shut off and the "return to home" sequence will be initiated. The adjustment of this switch is not critical, however it is important 'no binding of the lever arm occurs. Switch 104 is the DOWN LIMIT SWITCH. It is actuated by the operation of the IDLER LEVER (63) when either the claw has "bottomed out" on the plush or the downward movement of the claw is arrested by the own limit knot in the claw string. Operation of this switch, through the microprocessor, reverses the direction of operation of the claw control motor, thus raising the claw. Failure or misadjustment of, this switch or binding in the operation of IDLER LEVER (63) will result in the claw string being wound backwards on CABLE SPOOL (54) which will stall the claw control motor.

Should the situation arise where the claw string is wound backwards, the following procedure should release it.

- Shut the machine POWER, OFF.
- Hold the lever arm on switch 104 UP in the actuated position and turn POWER, ON. this should release the tension on the string.
- After tension is released, turn machine POWER, OFF and complete rewinding and/or re-threading by hand.

NOTE: The claw string may also be wound backwards due to problems on the logic board, ie: defective optoisolator, relay, relay driver transistor, microprocessor. In this case the above procedure will not work until the logic board is replaced.

Occasionally the claw string may become unthreaded. Should this occur, the above procedure will work with the addition of holding switch 103 in the DOWN position.

Incorporated in the microprocessor is a "watch dog" provision which will shut down the logic board should any situation arise which stalls a motor or prevents the microprocessor from receiving a "home" signal. This "watch dog" allows 15 seconds for the completion of an operation before shut-down. At shut down all relays will be de-energized and all motors stopped.

Other items to be periodically checked on the crane head assembly are:

- Condition of the RUBBER "O" RING (1) drive belts.
- HELIX GEARS (21) for excess wear.
- Condition of CLAW STRING
- Condition of COIL WIRE (81)

One of two CLAW COILS are furnished with the various cranes. The regular strength coil (87) has a typical resistance of 190 ohms while the extra strength coil (87A) has a typical resistance of approximately 125 ohms. This resistance may be measured at the white TERMINAL BLOCX (78) located near the lower left corner of the crane. This terminal block is also the location to read the coil Voltage. This reading will vary from approximately 33 volts to 68 volts, depending on the position of the coil strength potentiometer, the condition of the power supply, relay contacts and associated wiring.

"On the board" problems will normally consist of relay contact problems, failure of an opto-isolator or transistor, failure of a capacitor, power supply difficulties or an occasional logic failure.

Relay contact problems will normally be indicated by proper operation of the relay mechanically with improper operation of the associated motor, etc. However, if one of the capacitors, C7, C8 or C9 become "leaky" they may cause a similar result. If this is the case, the capacitor will normally soon short out completely and cause foil damage to the board. During this "leaky" period the capacitor should be quite warm to the touch. If any capacitor on the board feels exceptionally warm compared to surrounding capacitors, it should be replaced immediately.

The following is a listing of the eleven control opto-isolators and their associated functions:

U1	Coin Mechanism Input
u2	Dollar Bill Acceptor Input
u3	Joystick Input - Forward
U4	Joystick Input - Backward
U5	Joystick Input - Right
U6	Joystick Input - Left
U7	Joystick Input - Claw Down (Pushbutton)
uA	Claw Up Limit Switch
U9	Claw Down Limit Switch
U10	Left Home Limit Switch
U11	Forward Home Limit Switch

In the normal "at Home" condition all inputs to the opto-isolators are open with the exception of the LEFT and FORWARD Home Limit Switches. Measuring at pin 1 of opto-isolators 1 through 9 with a moderate impedance voltmeter should give a reading of approximately 12 volts.

Failure to obtain this reading would normally indicate; a failure of the 12 volt supply, open resistor pak R22 (resistor R28 or R29 in the case of U2 and U1 respectively), or open foil on the printed circuit board. Shorting pin 2 of the individual opto-isolators to ground should lower pin 1 of that optoisolator to approximately 1.2 volts. Failure to obtain this reading would indicate an open LED in the opto-isolator. Pin 5 of these opto-isolators should be at a "1" logic level (approximately 5 volts) while pin 2 is open and should swing to a "0" logic level (approximately .2 to .5 volts) when pin 2 is shorted to ground. An easy method to perform these checks is to actuate the various switches while monitoring the pin 5 voltage of the applicable opto-isolator. This provides a preliminary check of the opto-isolator, the switch and associated wiring and connectors. A failure to obtain the proper voltage swing at pin 5 would indicate a internal failure of the optoisolator, either the LED or photo transistor, an open R24, R25 or R21 resistor pak or failure of the 5 volt power supply. In the "at home" condition, pin 5 of U10 and U11 should be at "0" logic level. Manually moving the crane from the home position should cause pin 5 of the applicable opto-isolator to swing to a "1" logic state.

The power supplies utilized are all conventional design and require no special discussion.

PRIZE LIFT LIMITATIONS

When the Regular Strength Coil is being utilized in the Claw assembly and the claw potentiometer is set at Maximum Resistance, the claw will lift 4.5 ounces. When the potentiometer is set at Minimum Resistance, the claw will lift 27 ounces.

SWITCH TWO (2)

POSITIONS

1	7	a	GAME OPERATION
OFF	OFF	O F F	C GAME, NON-CENTERING
OFF	ON	OFF	C GAME, CENTERING
OFF	OFF	ON	B GAME, NON-CENTERING
OFF	ON	ON	B GAME, CENTERING
ON	OFF	OFF	B+ GAME, NON-CENTERING
ON	ON	OFF	B+ GAME, CENTERING
ON	OFF	ON	A+B GAME

DOLLAR BILL ACCEPTOR SETTINGS

2	3	DOLLARS REQUIRED PER DBA CREDIT
OFF	OFF	ONE
OFF	ON	TWO
ON	OFF	THREE
ON	ON	FOUR

4	5	6	GAMES PER DBA CREDIT
OFF	OFF	ON	ONE
OFF	ON	OFF	TWO
OFF	ON	ON	THREE
ON	OFF	OFF	FOUR
ON	OFF	ON	FIVE
ON	ON	OFF	SIX
ON	ON	ON	SEVEN

GAME DESCRIPTION

CGAME ** Joy stick gives full selection of position on playing field. Operation of RED joy stick button permits dropping of claw in small increments. When the claw dropping is impeded by plush or by reaching the limit of it's travel, claw closure and return to the home position is automatic. YOU MAY NOT RE-AIM after claw dropping is initiated.

B GAME ** Operation is the same as the C GAME except RE-AIMING of the claw is allowed after claw dropping is initiated. (This is known as the "dragger" game.)

B+ GAME ** Joy stick operation is the same as the previous games. Operation of the RED joy stick button initiates automatic dropping of the claw, claw closure and return home.

NOTE: When the CENTERING option is selected on the previous games, the claw will be automatically positioned in playing field center when credits are detected. Play cannot be commenced until this movement has occurred.

A+B GAME * This game setting may be used with either the joy stick or cwo button control. CENTERING option IS NOT available. The claw may be moved FORWARD to the desired position. When forward movement is stopped, this movement is locked. The claw may then be moved to the RIGHT. When RIGHT motion is stopped, automatic initialization of claw dropping, closure and return to home will occur.

DIP Switch Settings

Factory Settings are Shown in Bold

Switch 1		1	2	3	4	5	6	7
Bonus*	Off	Off						
	On	On					-	-
Coins per Credit	1		Off	Off				
	2		Off	On				
	3		On	Off				
	4		On	On				
Games per Credit	Burn In				Off	Off	Off	
	1				Off	Off	On	
	2				Off	On	Off	
	3				Off	On	On	
	4				On	Off	Off	
	5				On	Off	On	
	6				On	On	Off	
7				On	On	On		
Game Timer (seconds)	10							On
	15							Off
	20							Off
	25							On

- Bonus setting will award one extra coin for four consecutive coins

Switch 2		1	2	3	4	5	6	7	8
Dollars per DBA Credit	1		Off	Off					
	2		Off	on					
	3		On	Off					
	4		On	On					
Games per DBA Credit	0				Off	Off	Off		
	1				Off	Off	On		
	2				Off	On	Off		
	3				Off	On	On		
	4				On	Off	Off		
	5				On	Off	On		
	6				On	On	Off		
7				On	On	On			
Centering	Off							Off	
	On							On	
Game Configuration*	C	Off							Off
	B	Off							On
	B+	On							Off
	A+B	Off							On

* See manual for details on Game Configuration

GAME CONFIGURATION DESCRIPTION

C GAME : Joy stick gives full selection of position on playing field. Operation of red joy stick button permits dropping of claw in small increments. When the claw dropping is impeded by push or by reaching the limit of it's travel, claw closure and return to the home position is automatic. **YOU MAY NOT RE-AIM** after claw dropping is initiated.

B GAME : Operation is the same as the C GAME except **RE-AIMING** of the claw is allowed after claw dropping is initiated. (This is known as the "dragger" game.)

B + GAME : Joy stick operation is the same as the previous games. Operation of the RED joy stick button initiates automatic claw drop, claw closure and home return.

NOTE : When the **CENTERING** option is selected on the previous games, the claw will be automatically positioned in playing field center when credits are detected. Play cannot be commenced until this movement has occurred.

A+B GAME : This game setting may be used with either the joy stick or the button control. **CENTERING** option **IS NOT** available. The claw may be moved **FORWARD** to the desired position. When forward movement is stopped, this movement is locked. The claw may then be moved to the **RIGHT**. When **RIGHT** motion is stopped, automatic initialization of claw dropping, closure and return to home will occur. likewise **RIGHT** motion may be initiated first. followed only by **FORWARD** movement.

BURN IN CONFIGURATION

This unit is equipped with a "Bum-In Mode" setting which allows for testing before leaving the factory. In "Bum-In Mode" the claw will move out, drop, close and return home every 20 seconds. To enable "Bum-In Mode" set positions **4, 5, 6** of DIP Switch 1 **OFF**.

CLEAN SWEEP - WITH SWITCH CHECK

The Clean Sweep program includes a test routine that checks **all** crane harness and coin harness microswitches upon power-up.

When the game is turned on, the claw closes, and the game goes into the switch check mode. The credit/timer display is used to indicate to the user any faulty microswitches in the following manner:

<u>Display</u>	<u>Indication</u>
Upper (credit)	Reference number of switch at fault.
Lower (timer)	Total number of switches faulty (max. of 11)

The convention used is that the upper display shows the reference no. of **each faulty** switch for 2 seconds. The lower display shows the total number of faulty switches throughout this time. (Reference numbers with corresponding switches are provided on a separate sheet)

Example: Suppose the joystick left switch, the coin switch (both on the coin harness side), and the closecommand switch (on the **crane harness side**) are closed instead of being normally open. When you turn. **on the game**, the following should be seen.

<u>Display</u>	<u>Indication</u>	<u>Reference</u>
Upper display	9, 6, 1	9 - Closecommand 6 - Joystick left 1 - Coin
Lower display	3	Total # of bad switches

The numbers 9, 6 and 1 will light for approximately 2 seconds each.

The test routine Will check a total of 11 microswitches. If there are no **faulty** switches detected, the claw will snap twice (if already at home) and the game will start right up with "00" displayed on both displays.

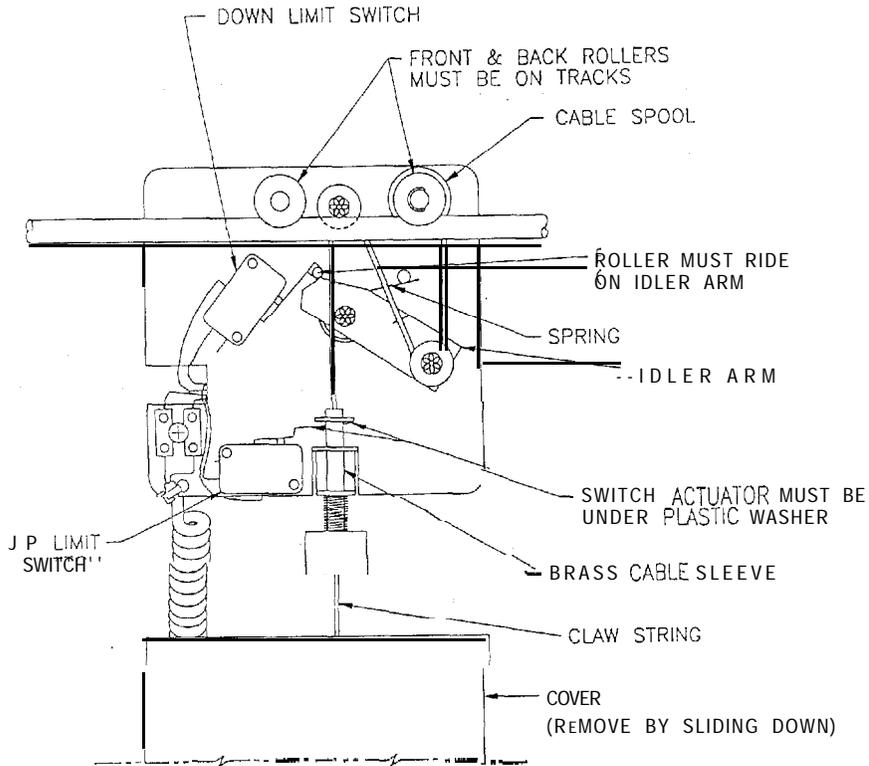
Coin Time-out

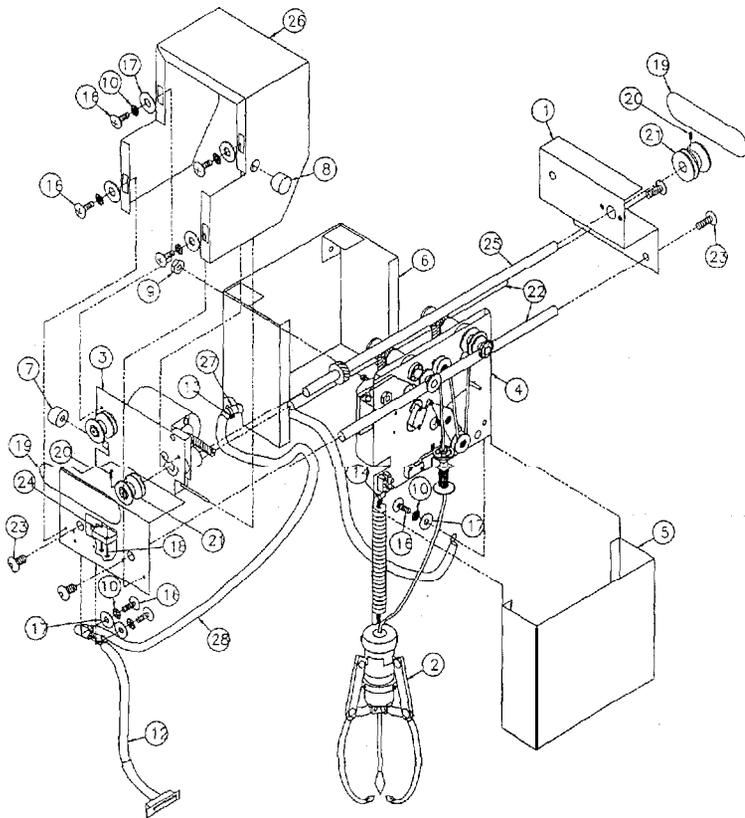
In many cases, coin-mechanisms may be obstructed with coins or other objects as a result of a faulty **mech.** or vandalism. As a solution, this program discontinues reading coins from the coin mech if the coin switch is detected to be on for a period longer than 5 seconds.

Microswitch Reference Numbering

<u>Operation</u>	<u>Reference #</u>
Coin	1
Dollar	2
Joystick Forward	3
Joystick Back	4
Joystick Right	5
Joystick Left	6
Joystick Down (pushbutton)	7
Up/Down Limit	8
Close Claw Limit	9
Left Limit	10
Home Limit (forward limit)	11

DOUBLE MOTOR ASSEMBLY DIAGRAM

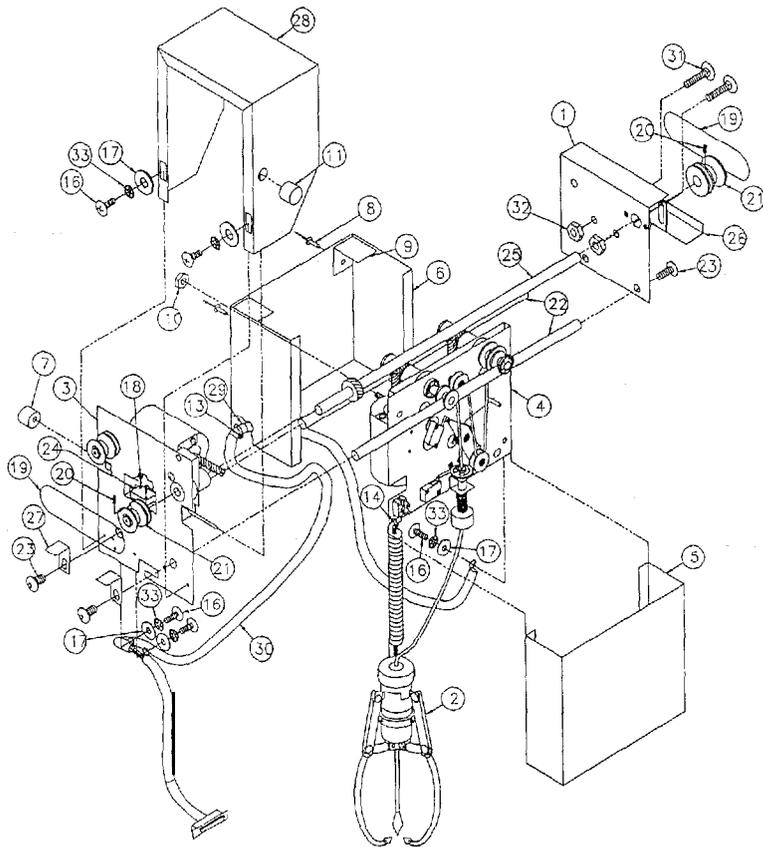




ITEM	QTY	P/N	DESCRIPTION	
	1	4823	ASSY, TROLLEY END PLATE	
	2	4238	ASSY, CLAW SMALL	
	1	4820	ASSY, TROLLEY MOTOR,	
	4	4407	ASSY, DOUBLE MOTOR, STANDARD	
	5	1646	COVER, CRANE FRONT	
	5	5306	ASSY, MOTOR COVER	
	1	6558	STOP, ACTUATOR SWITCH	
	8	7276	STOP, ACTUATOR SWITCH LARGE	
	9	60097	NUT, LOCK #10-32 NYLON INSERT	
	10	7	WASHER, LOCK #8 INTERNAL STAR	
	11			
	12	4414	ASSY, HARNESS, CRANE, C.S. DOUBLE	
	13	60112	TIE, WIRE, 5' NATURAL NYLON	
	14	60057	TIE, WIRE, 4' NATURAL NYLON	
	15	10 ¹	TUBING, HEAT SHRINK, 1/8 DIA. BLACK	
	16	7	63156	SCREW, MACH, PPH, #8-32 X 1/4
	17	7	60115	WASHER, FLAT, #8, ZINC
	18	2	60110	SCREW, M A C H . PPH, #4-40 X 1/2
	19	2	60023	O-RING, RUBBER #H70-153
	20	2	60820	SCREW, SET X10-24 X 5/16
	21	2	ROLLER, LARGE DRIVE, DRILLED & TAPPED	
	22	2	1529	TUBE, CRANE TRACK, DOUBLE/LH 57
	23	4	60903	BOLT, BUTTON HD CAP 5/16-18 X 1/2
	24	1	53004	MICRO SWITCH, V3L-2227-DB
	25	1	4837	ASSY, TROLLEY DRIVE SHAFT, DOUBLE
	26	1	7190	COVER, TROLLEY MOTOR
	27	2	70021	TUBING, PVC BLACK, 3/8 DIA. THIN WALL
	28	1	70359	SPRING, FLEX CONDUIT, 27"

ASSY, CRANE
CLEAN SWEEP DOUBLE

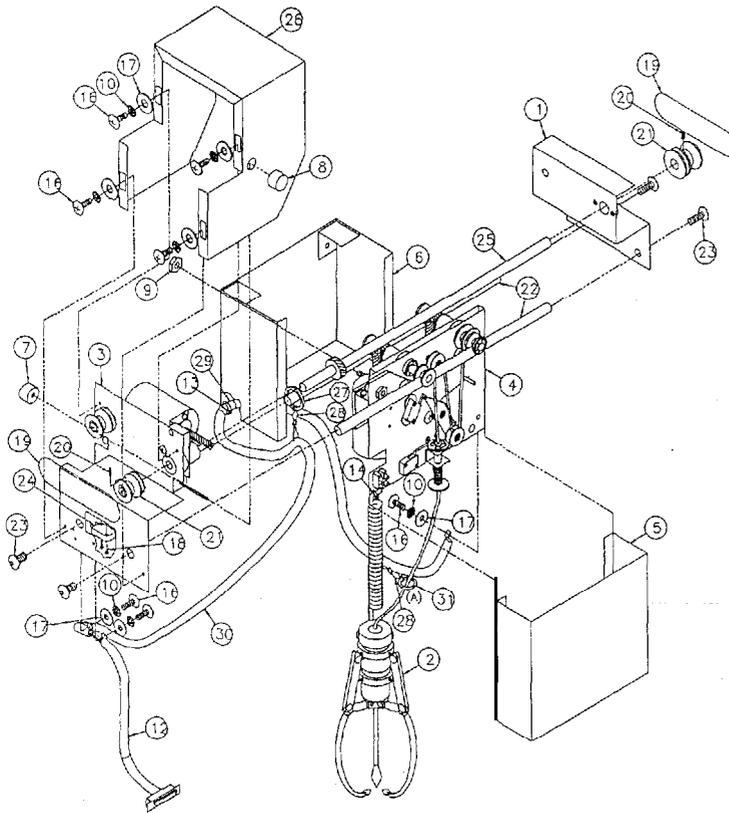
3273



ITEM	QTY	P/N	DESCRIPTION
	1	4828	ASSY, TROLLEY END PLATE, C.S.TRIPLE
1	1	4238	ASSY, CLAW, REGULAR
3	1	4855	ASSY, TROLLEY MOTOR, C.S.TRIPLE
4	1	4407	ASSY, DOUBLE MOTOR CLEAN SWEEP
	1	.646	COVER, CRANE FRONT
6	1	0017	COVER, CRANE MOTOR
	1	6558	STOP. ACTUATOR SWITCH
8	2	60006	RIVET, P.O.P. #8 X 1/2 STEEL
9	1	6554	KEEPER CRANE
10	1	60168	NUT, HEX, #10-32, ZINC
11	1	60046	WASHER, LOCK, #10 SPLIT, ZINC
12	1	3457	ASSY, HARNESS, CRANE, SINGLE/TRIPLE
13	1	60112	TIE, WIRE, 5" NATURAL NYLON
14	1	60057	TIE, WIRE, 4" NATURAL NYLON
15	10'	70055	TUBING, HEAT SHRINK, 1/8 DIA, BLACK
16	5	60156	SCREW, MACH, PPH, #8-32 X 1/4
17	5	60115	WASHER, FLAT, #8, ZINC
18	2	60110	SCREW, MACH, PPH, #4-40 X 1/2
19	1	60023	O-RING, RUBBER #H70-153
20	2	60820	SCREW, SET, #10-24 x 5/16
21	2	0006	ROLLER, LARGE DRIVE, DRILLED & TAPPED
22	1	0036	TUBE, CRANE TRACK, TRIPLE
23	1	60903	BOLT, BUTTON HD CAP 5/16-18 x 1/2
24	1	50004	MICRO SWITCH, V3L-2227-DB
25	1	4832	ASSY, TROLLEY DRIVE SHAFT, SINGLE/TRIPLE
26	1	5733	BRACKET, CRANE KEEPER
27	1	6549	KEEPER, LEFT SIDE
28	1	0012	COVER, TROLLEY MOTOR
29	2'	7002	TUBING, PVC BLACK, 3/8 DIA, THIN WALL
30	1	70359	SPRING, FLEX CONDUIT, 27"
31	1	60714	BOLT, CARR 1/4-20 x 1/2 ZINC
32	2	60015	NUT, 1/4-20 NYLOCK INSERT
33	5	60690	WASHER, LOCK #8 INTERNAL STAR

ASSY, CRANE
CLEAN SWEEP **TRIPLE**

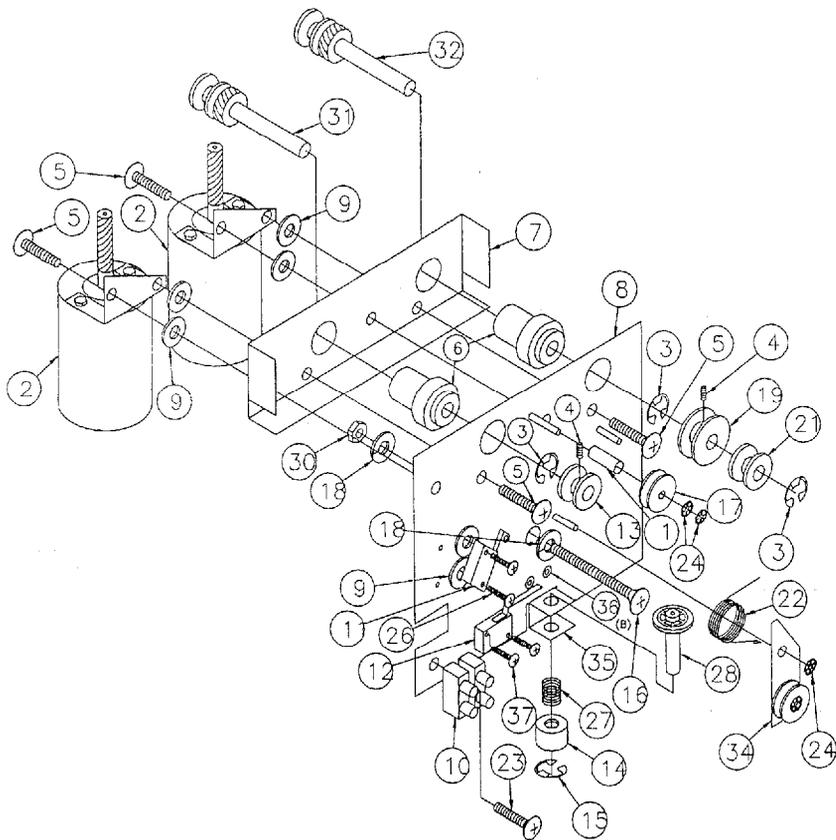
3297



ITEM	QTY	P/N	DESCRIPTION
	1	4823	ASSY, TROLLEY END PLATE
1	1	5318	ASSY, CLAW, JUMBO
	1	4820	ASSY, TROLLEY MOTOR
	1	4407	ASSY, DOUBLE MOTOR, STANDARD
5	1	1646	COVER, CRANE FRONT
	1	5305	ASSY, MOTOR COVER
7	1	6558	ACTUATOR, STOP SWITCH
8	1	7276	STOP, ACTUATOR SWITCH LARGE
9	1	60097	NUT, LOCK, #10-32 NYLON INSERT
10	7	60690	WASHER, LOCK #8 INTERNAL STAR
11			
12	1	4412	ASSY, HARNESS, CRAVE, S.S./J.J./57"RH
13	1	60112	TIE, WIRE, 5" NATURAL NYLON
14	2	60057	TIE, WIRE, 4" NATURAL NYLON
15	10'	70055	TUBING, HEATSHRINK, 1/8 DIA, BLACK
16	7	60156	SCREW, MACH, PPH, #8-32 X 1/4
17	1	60115	WASHER, FLAT, #8 ZINC
18	1	60110	SCREW, MACH. PPH. #4-40 X 1/2
19	1	60023	C-RING, RUBBER #H70-153
20	2	60820	SCREW, SET #10-24 X 5/16
21	2	0006	ROLLER, URGE DRIVE, DRILLED & TAPPED
22	2	6560	TUBE, CRANE TRACK, SUPER SINGLE/J.J.
23	4	60903	BOLT, BUTTON HD CAP 5/16-18 x 1/2
24	1	50004	MICRO SWITCH, V3L-2227-DB
25	1	4824	ASSY, TROLLEY DRIVE SHAFT, S.S./J.J.
26	1	7190	COVER, TROLLEY MOTOR
27	1	60282	KEY RING, 7/8 DIA. SPLIT
28	1	6028	SWIVEL, #6, BRASS
29	2"	70021	TUBING, PVC BLACK, 3/8 DIA. THIN WALL
30	1	70360	SPRING, FLEX CONDUIT, 36"
31	1	60641	KEY RING, 1/2 DIA. SPLIT

ASSY, CRANE
JUNIOR JUMBO

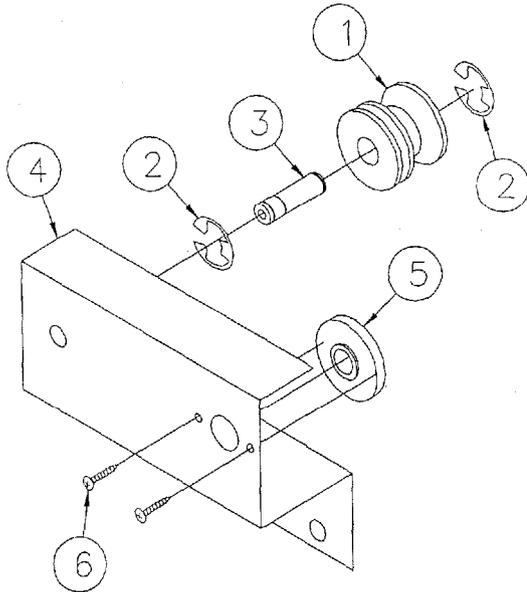
3343



ITEM	QTY	P/N	DESCRIPTION
1	1	0057	SLEEVE, CABLE ROLLER BRASS
2	2	5872	ASSY, MOTOR, BRACKET AND SHAFT
3	3	60024	E-RING, 3/8 DIA.
4	2	60821	SCREW, SET #10-24 X 1/4
5	4	60174	SCREW, PPH, #10-32 X 3/4, ZINC
6	2	0050	BEARING, NYLON THRUST
7	1	6551	PLATE, SHAFT ALIGNMENT
8	1	4815	ASSY, CRANE FLATE
9	6	60043	WASHER, #10 FLAT, ZINC
10	1	1815	TERMINAL BLOCK (2)
11	1	50142	MICRO SWITCH, VSL-1101-DB
12	1	50004	MICRO SWITCH, VSL-2227-DB
13	1	0060	SMALL ROLLER DRILLED AND TAPPED
14	1	8213	STOP, ANTI-SWAY CLAW
15	2	60027	E-RING, 5/16 DIA.
16	1	60031	SCREW, MACH, PPH, #10-32 X 3, ZINC
17	1	0058	ROLLER, CABLE
18	2	60048	WASHER, LOCK SPLIT #10 ZINC
19	1	6568	SPOOL, CABLE DRILLED AND TAPPED
20			
21	1	0019	ROLLER, SMALL
22	1	60029	SPRING, LEVER
23	1	60047	SCREW, MACH, PPH, #8-32 X 3/4, ZINC
24	3	60030	NUT, PUSH, 3/16
25			
26	2	60050	SCREW, MACH, PPH, #4-40 X 3/4, ZINC
27	1	60032	SPRING, CLAW
28	1	4922	ASSY, CABLE SLEEVE/WASHER
29			
30	1	60188	NUT, HEX #10-32 ZINC
31	1	4817	ASSY, CRANE DRIVE SHAFT
32	1	4818	ASSY, CLAW DRIVE SHAFT
33			
34	1	4819	ASSY, ROLLER LEVER
35	1	6571	TUBE, SPRING STABILIZER
36	2	60673	RVET, STEEL POP 1/8 X 1/4
37	2	60110	SCREW, MACH, PPH, #4-40 X 1/2, ZINC

ASSY, DOUBLE MOTOR
CLEAN SWEEP

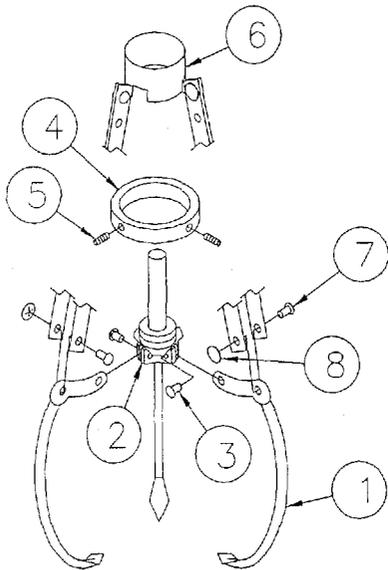
4407



ITEM	QTY	P/N	DESCRIPTION
1	1	0003	ROLLER, FREE LARGE
2	2	60024	E-RING, 3/8 DIA.
3	1	6545	SHAFT, FREE ROLLER
4	1	6550	PLATE, TROLLM END
5	1	0038	BUSHING, SHAFT
6	2	60042	SCREW, PPH, #4 X 1/4 ZINC

ASSY, TROLLEY END
 PLATE, CLEAN SWEEP

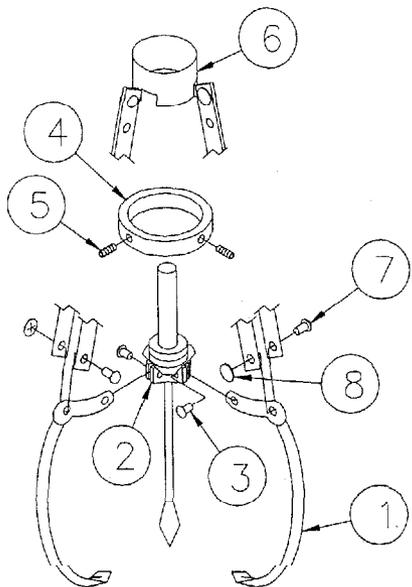
4823



ITEM	QTY	P/N	DESCRIPTION
1	3	4770	FINGER, CLAW, INTERMEDIATE
2	1	5307	ASSY, SUB, PLUNGER, REGULAR
3	3	60035	RIVET, SOLID ALUMINUM, 1/8 X 5/8 L.
4	1	0091	RING, CLAW ADJUSTING
5	2	60041	SCREW, SS, #6--32 X 3/16
6	1	5312	ASSY, SUB, CLAW SLIDE
7	3	60035	RIVET, SOLID ALUMINUM, 1/8 X 5/16 L
8	3	63037	WASHER, 3 MM STAR LOCK W/CAP

ASSY, SUB, CLAW
INTERMEDIATE, REG. C.S.

5311



ITEM	QTY	P/N	DESCRIPTION
1	3	5310	FINGER, CLAW, SMALL
2	1	5307	ASSY, SUE. PLUNGER, REGULAR
3	3	60035	RIVET, SOLID ALUMINUM, 1/8 X 5/8 L.
4	1	0091	RING, CLAW ADJUSTING
5	2	60041	SCREW SS, #6-32 X 3/16
6	1	5312	ASSY, SUB, CLAW SLIDE
7	3	60036	RIVET, SOLID ALUMINUM, 1/8 X 5/16 L.
8	3	60037	WASHER, 3 MM STAR LOCK W/CAP

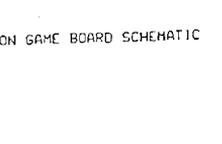
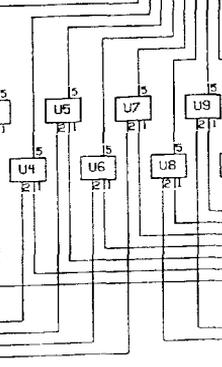
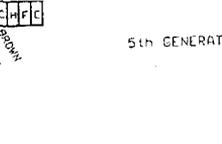
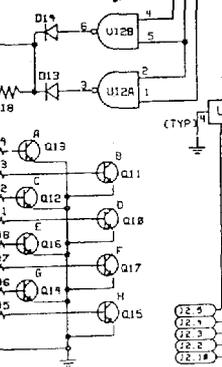
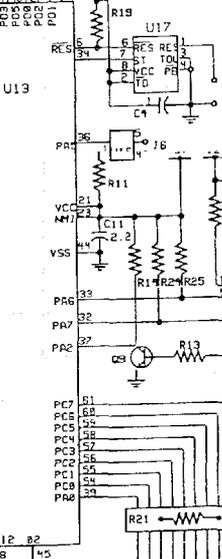
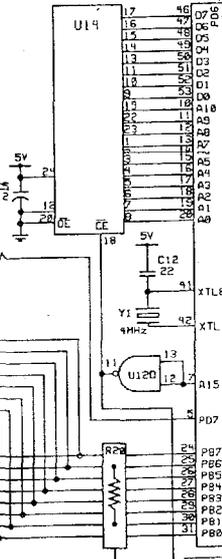
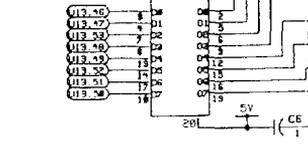
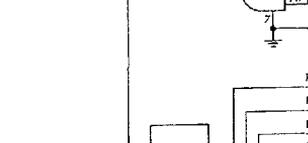
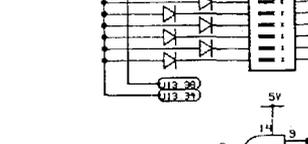
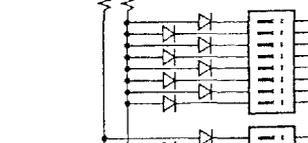
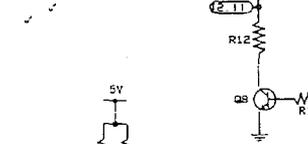
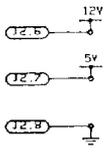
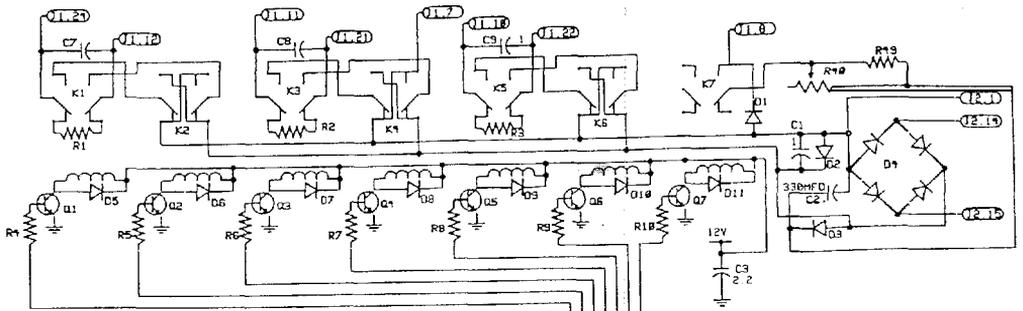
ASSY, SUB, CLAW
SMALL, C.S.

5316

FIFTH GENERATION CRANE PCB ASSY

See 5th Gen Game Board Layout

J1-1	Down Limit Switch	Red	J3-1	DBA Switch Ground	Violet
J1-2	Not Used		J3-2	DBA Switch	Pink
J1-3	Up Limit Switch	White	J4-1	Coin Lights Ground	Wh/Bk
J1-4	Not Used		J4-2	Coin Lights +12 VDC	Wh/Rd
J1-5	Left/Right Limit Switch	Yellow	J5-1	+12 V D C	Red
J1 -6	Fwd/Bwd Limit Switch	Violet	J5-2	Prize Detect	Wh/Gn
J1-7	Fwd/Bwd Limit Gnd	Black	J6-1	Not Used	
J1-8	Claw Solenoid	Green	J6-2	Not Used	
J1 -9	Not Used		J7-1	Not Used	
J1-10	Up/Down Motor +	Orange	J7-2	Not Used	
J1-11	Left/Right Motor +	Blue	J7-3	Right Button Light	Blue
J1-12	Fwd/Bwd Motor-	Gray	J7-4	Display A Clock	Brown
J1-13	Not Used		J7-5	Fwd Button Light	Green
J1-14	Down Limit Switch	White/Yellow	J7-6	Display 8 Clock	Yellow
J1-15	Not Used		J7-7	Display 8 Reset	Orange
J1-16	Up Limit Switch	White/Green	J7-8	Display A Reset	Green
J1-17	Not Used		J7-9	Display +12 VDC	Red
J1-18	Left/Right Limit Gnd	Brown	J7-1 0	Display/Button Ground	Black
J1-19	Not Used				
J1-20	Claw Solenoid Gnd	White/Blue			
J1-21	Not Used				
J1-22	Up/Down Motor-	White/Violet			
J1-23	Left/Right Motor-	Pink			
J1-24	Fwd/Bwd Motor +	White/Red			
J 1-25	Not Used				
J2-1	Coin Switch Gnd	Green			
J2-2	Joystick Left Switch	White/Orange			
J2-3	Joystick Right Switch	White/Yellow			
J2-4	Joystick Bwd Switch	Red			
J2-5	Joystick Fwd Switch	White			
J2-6	+12 V D C	Yellow			
J2-7	+ 5 V D C	Red			
J2-8	Ground	Black			
J2-9	Coin Switch	White/Green			
J2-10	Joystick Button Switch	White/Blue			
J2-11	Coin Meter +	White/Red			
J2-1 2	Coin Meter-	Pink			
J2-13	Joystick Switch Ground	White/Violet			
J2-14	48 VAC	Blue			
J2-15	48 VAC	Green			



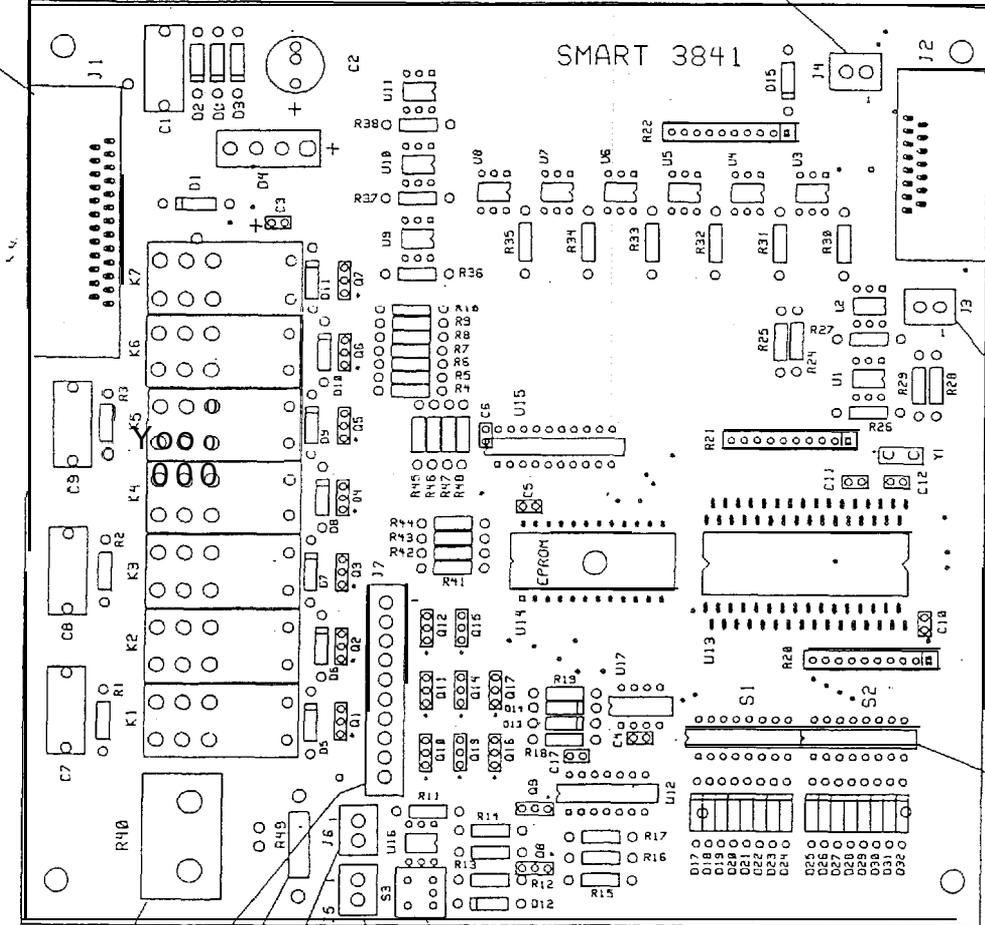
5th GENERATION GAME BOARD SCHEMATIC

5 GEN. GAME BOARD
PARTS LIST

<u>SYMBOL</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
C12	CAPACITOR	33 PFD CERAMIC
C4,6	CAPACITOR	.1 MFD 50V CERAMIC .100 LEAD SPACING
C1,7,8,9	CAPACITOR	.1 MFD 630V POLYESTER
C3,5,10,11	CAPACITOR	2.2 MFD 16V TANTALUM
C2	CAPACITOR	330 MFD 100V ELECT.
J3,4,5,6	CONNECTOR	2 PIN LOCKING HEADER .156 SPACING .045 SQ PINS
J7	CONNECTOR	10 PIN LOCKING HEADER .156 SPACING .045 SQ PINS
J2	CONNECTOR	D-SUB 15 SOCKET FEMALE PC MOUNT
Y1	CRYSTAL	4.0 KHZ TYPE MP-1
D1,D5, THRU D15, D17 THRU D32	DIODE	1N914
D3,D4,R39	DIODE	1N4001
U1 THRU U11	IC	4M25 OPTO-ISOLATOR
U17	IC	DS1232 MICROMONITOR
U14	IC	M2732AF1 E-PROM
U13	IC	86511AQ MICROPROCESSOR
*12	IC	74LS00

<u>SYMBOL</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
U15	IC	74LS373
R40	POTENTIOMETER	125 OHM 12 1/2 WATT
D4	RECTIFIER	KBLO1 BRIDGE RECTIFIER
K1 THRU K7	RELAY	RELAY DPDT, 12V COIL
R1,2,3	RESISTOR	27 OHM 1/2 WATT 5% CARBON FILM
R11,R17	RESISTOR	330 OHM 1/2 WATT 5% CARBON FILM
R18,R28,R29	RESISTOR	1000 OHM 1/2 WATT 5% CARBON FILM
R4 THRU R10, R13 THRU R16, R19, R41 THRU R48	RESISTOR	3900 OHM 1/2 WATT 5% CARBON FILM
R24,R25	RESISTOR	4700 OHM 1/2 WATT 5% CARBON FILM
R26,27,R30 THRU R38	RESISTOR	1 MEG OHM 1/2 WATT 5% CARBON FILM
R12	RESISTOR	27 OHM 1/2 WATT 5% CARBON FILM
R22	RESISTOR PAK	1000 OHM SIP
R21	RESISTOR PAK	4700 OHM SIP
R20	RESISTOR PAK	22K OHM SIP
S1,S2	SWITCH	DIP SWITCH, 8 POSITION SPST
Q1 THRU Q17	TRANSISTOR	PN2222A
PS1	SWITCHING POWER SUPPLY - PART#	50572

J1, CRANE HARNESS CONNECTOR



J4, COIN MECH LIGHTS

J3, DOLLAR BILL ACCEPTOR

S1, S2, GAME SETTINGS DIP SWITCHES

J2, COIN HARNESS CONNECTOR

R40, CLAW STRENGTH ADJUST POTENTIOMETER

J7, DISPLAY & LAMP OUTPUTS

R49, CLAW STRENGTH COMPENSATE

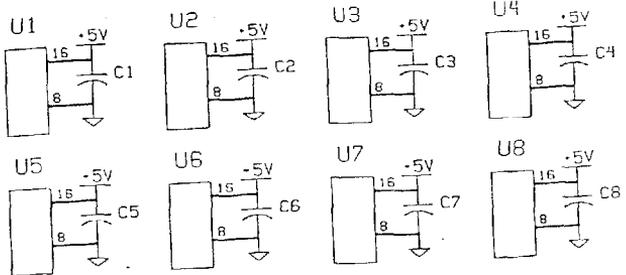
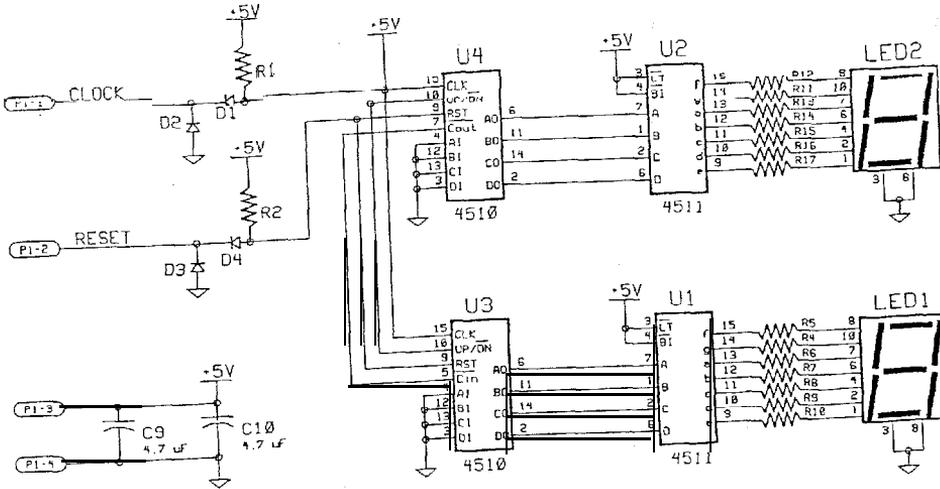
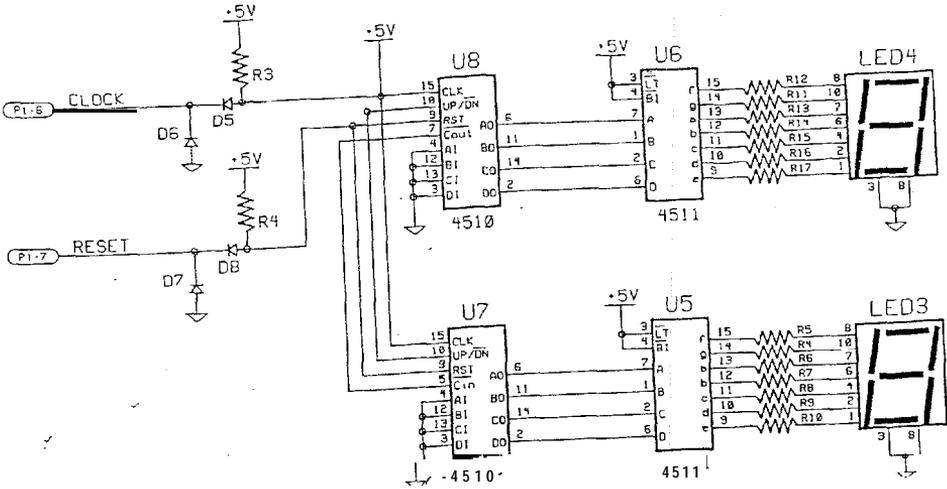
J6, TICKET DISP. GUMBALL DISPENSER & COIN LOCKOUT OUTPUT

J5, PHOTOEYE/LAW-CLOSE INPUT, OR POWER SUPPLY OUTPUT

S3, JUMPER CONFIG. LEFT: POWER SUPPLY RIGHT: PHOTOEYE /CLAW CLOSE INPUT

5th GEN. CRANE GAME BOARD - LAYOUT

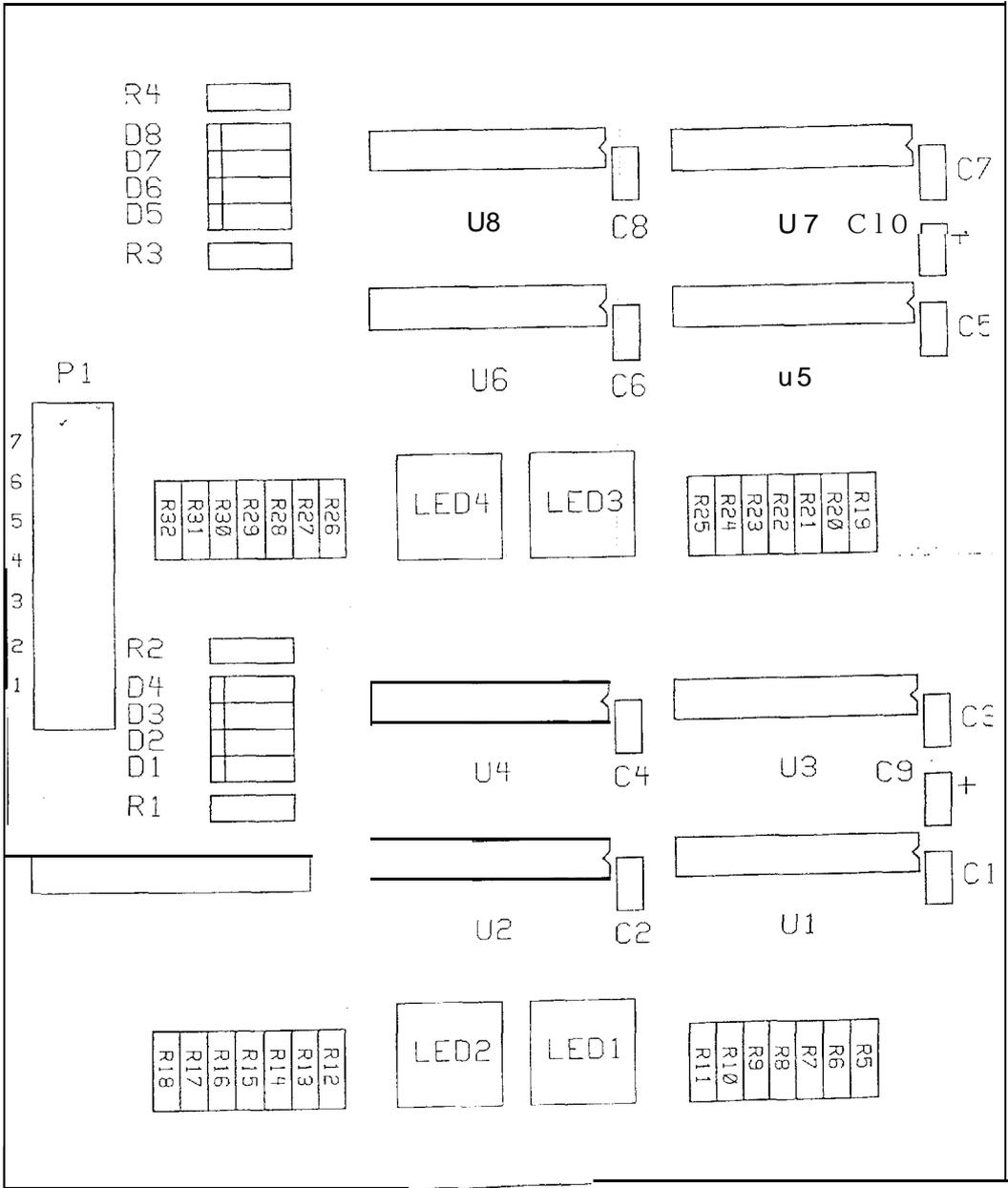
CREDIT TIMER



CREDIT/TIMER DISPLAY PARTS

<u>SYMBOL</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u> ¹
LED1 - LED4	DISPLAY	7-SEGMENT DISPLAY, COMMON CATHODE
C1 - C8	CAPACITOR	.1uF, 50 Volt, Ceramic
C9, C10	CAPACITOR	4.7uF, 50 Volt Electrolytic
R1 - R4	RESISTOR	10K Ohm, $\frac{1}{4}$ Watt
R5 - R32	RESISTOR	1K Ohm, $\frac{1}{4}$ Watt
D1 - D8	DIODE	1N914, or 1N4148
U3, u4, U7, U8	IC	4510 - Up/Down Counter
U1, U2, u5, U6	IC	4511 - 7 Segment Decoder
P1	CONNECTOR	7 Pin, .156 Header

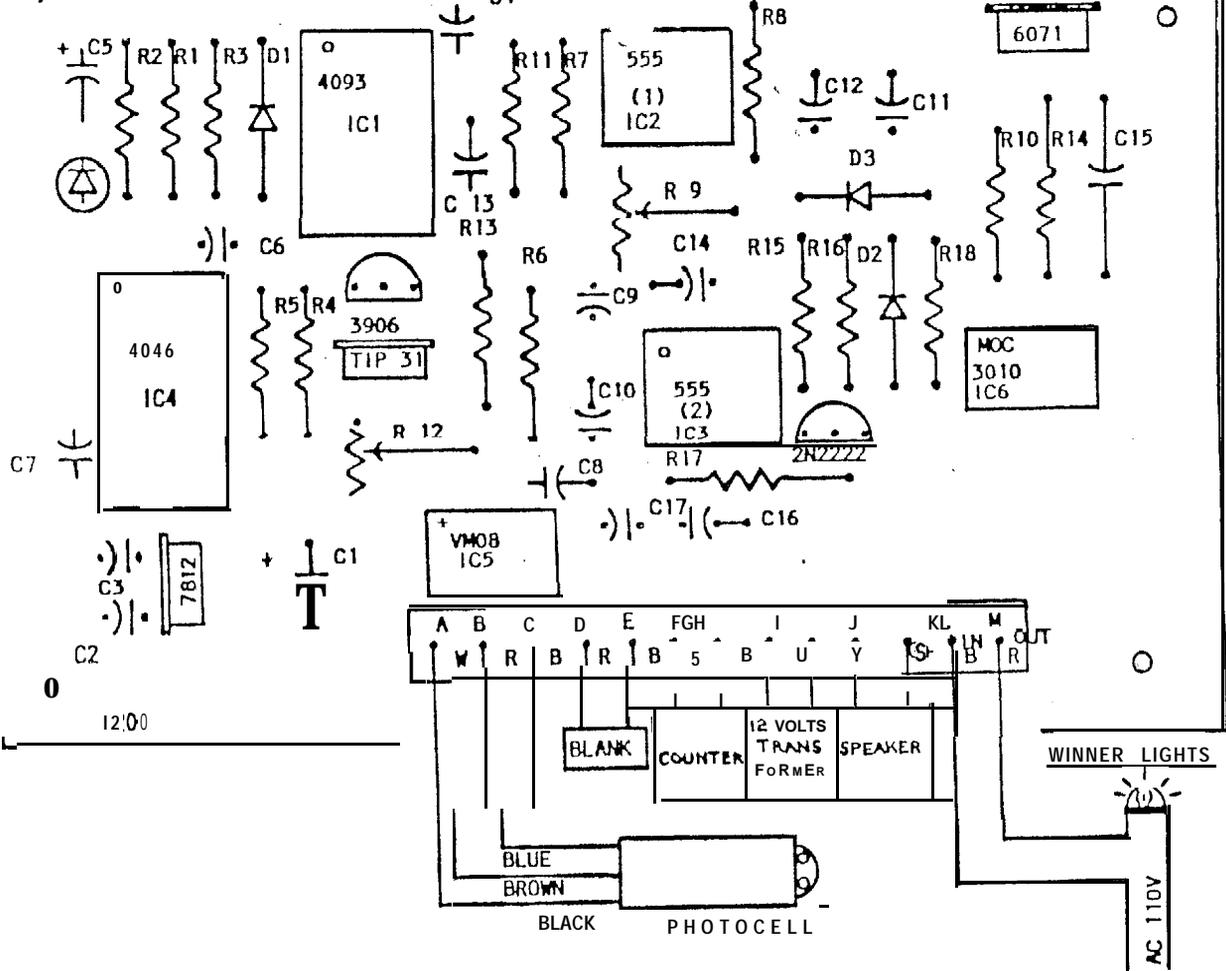
CREDIT/TIMER PARTS LAYOUT



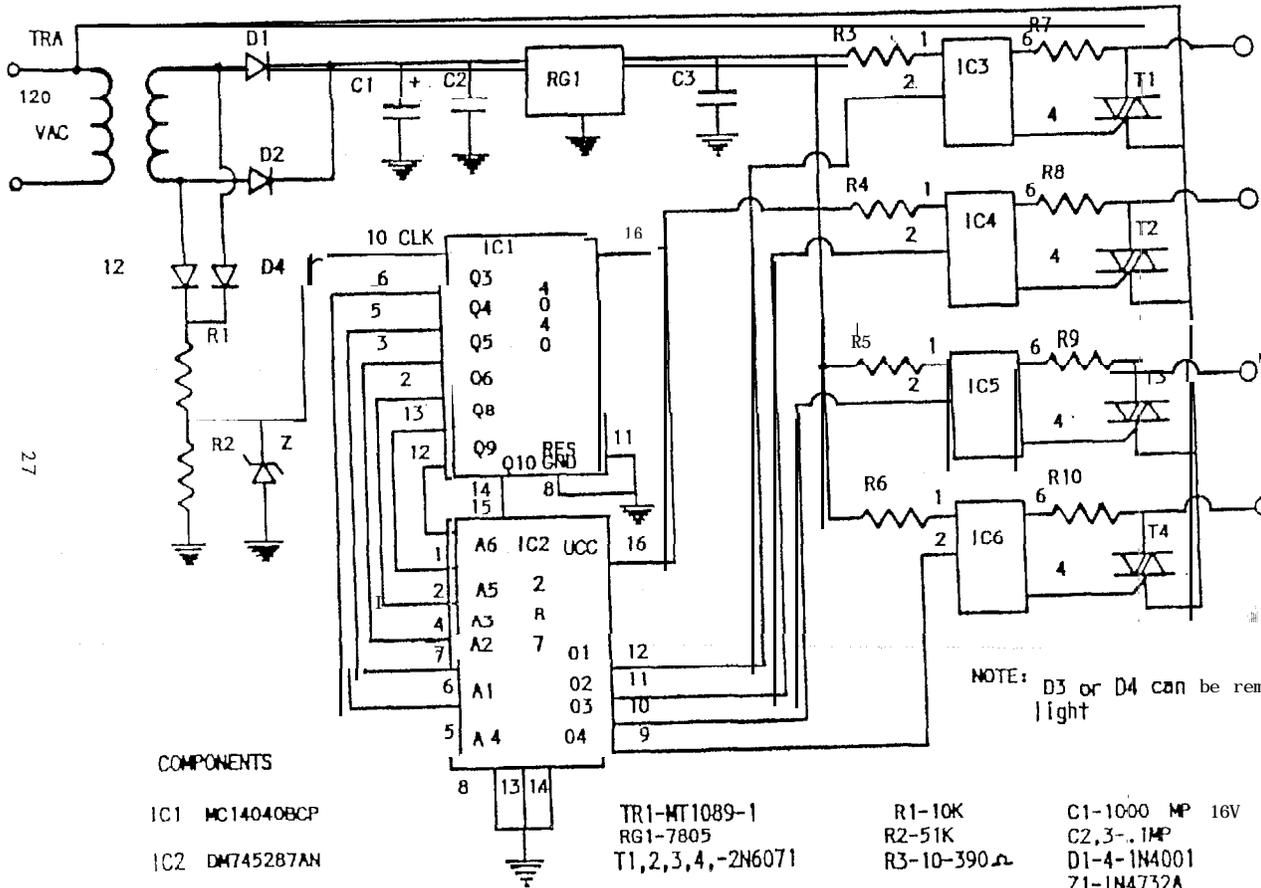
DISPLAY 1-4 MOUNTED ON OTHER SIDE

PRIZE COUNTER PARTS LIST

<u>SYMBOL</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
IC6	IC	OPTO COUPLER
IC2, IC3	IC	NE555N TIMER
IC1	IC	MC14093BCP QUAD 2-INPUT NAND
IC4	IC	MC14046BCP PHASE LOCKED LOOP
ICS	RECTIFIER	VM08 BXIDCE
D1, D2, D3	DIODE	1N914 OF 1N4148 GLASS
C2, 3, 4, 6.7. 9. 17	CAPACITOR	.1 MFD 50 V. CERAMIC .100 LEAD SPACING
C8, C10, C13	CAPACITOR	1.0 MFD. 50 V. ALUMINIUM ELECTROLYTIC
C11, C12	CAPACITOR	10 MFD. 16 V. ALUMINIUM ELECTROLYTIC
C16	CAPACITOR	2.2 MFD. 16 V. TANTALUM
C14	CAPACITOR	47 MFD. 16 V. ALUMINIUM ELECTROLYTIC
C1	CAPACITOR	2200 MFD. 35 V. ALUMINIUM ELECTROLYTIC
C15	CAPACITOR	.1 MFD. 630 V. POLYESTER .600 LEAD SPACE
C5	CAPACITOR	2.2 MFD. 16 V. TANTALUM
X16	RESISTOR	33 OHM 5% 1/4 WATT CARBON FILM
R13, R14	RESISTOR	100 OHM 5% 1/4 WATT CARBON FILM
R8	RESISTOR	200 OHM 5% 1/4 WATT CARBON FILM
R10	RESISTOR	330 OHM 5% 1/4 WATT CARBON FILM
R18	RESISTOR	560 OHM 5% 1/4 WATT CARBON FILM
R1, R2, R7	RESISTOR	1000 OHM 5% 1/4 WATT CARBON FILM
R11	RESISTOR	10K OHM 1/4 WATT CARBON FILM
x4	RESISTOR	20K OHM 5% 1/4 WATT CARBON FILM
R6, R1b	RESISTOR	100K OHM 5% 1/4 WATT CARBON FILM
R3, R5	RESISTOR	1 MEG OHM 5% 1/4 WATT CARBON FILM
R17	RESISTOR	27 OHM 5% 1/4 WATT CARBON FILM
R12	POTENTIOMETER	20K OHM .75 WATT CERHET TRIMMER, SINGLE TURN
R9	POTENTIOMETER	1 MEG OHM .75 WATT CERHET TRIMMER, SINGLE TURN



PRIZE COUNTER PIN OUT & PART LAYOUT



NOTE: D3 or D4 can be removed to decrease light

COMPONENTS

- IC1 MC14040BCP
- IC2 DM745287AN
- IC 3,4,5,6.

- TR1-MT1089-1
- RG1-7805
- T1,2,3,4,-2N6071

- R1-10K
- R2-51K
- R3-10-390Ω

- C1-1000 MP 16V
- C2,3-.1MP
- D1-4-1N4001
- Z1-1N4732A

LIGHT BOARD

CLEAN SWEEP WINDOW AND MIRROR MEASUREMENTS

**“(WARNING!!! ITEMS CHECKED WITH AN ASTERISK
ARE MADE WITH TEMPERED GLASS. REPLACEMENTS MUST
USE TEMPERED GLASS FOR SAFETY)”**

CLEAN SWEEP SINGLE (CSS)

*FRONT WINDOW(P/N 6591)	28 3/16" X 22 13/16"
*SIDE GLASS (P/N 0329)	27" X 43 1/2"
BRONZE GLASS(P/N 3240)	23 13/16" X 12 1/4"
BACK MIRROR(P/N 6607)	22 3/4" x 30"
MARQUEE MIRROR(P/N 32 17)	22 1/4" x 9 7/8"

CLEAN SWEEP SUPER SINGLE(CSSS)

*FRONT WINDOW(P/N 6592)	28 3/16" X 30 13/16"
*SIDE GLASS (P/N 6590)	25" x 43 1/2"
BRONZE GLASS(P/N 6603)	31 13/16" X 12 1/4"
BACK MIRROR(P/N 6608)	30 3/4" x 30"
MARQUEE MIRROR(P/N 6575)	30 1/2" x 9 7/8"

CLEAN SWEEP JUNIOR JUMBO(CSJJ)

*FRONT WINDOW(P/N 6592)	28 3/16" X 30 13/16"
*SIDE GLASS(P/N 6600)	25" x 55"
BRONZE GLASS(P/N 6603)	31 13/16" X 12 1/4"
BACK MIRROR(P/N 6608)	30 3/4" x 30"
MARQUEE MIRROR(P/N 6577)	30 1/2" x 9 7/8"

CLEAN SWEEP DOUBLE (CSD)

*FRONT WINDOW(P/N 6593)	23" X 29"
*SIDE GLASS(P/N 6590)	25" X 43 1/2"
BRONZE GLASS(P/N 6604)	46" X 12 1/4"
BACK MIRROR(P/N 6609)	45" x 30"
MARQUEE MIRROR(P/N 6578)	44 1/2" x 9 7/8"

CLEAN SWEEP TRIPLE(CST)

*FRONT WINDOW(P/N 6594)	23 3/4" X 29"
*SIDE GLASS(P/N 6890)	25" X 43 1/2"
BRONZE GLASS(P/N 6605)	6X 1/4" X 12 1/4"
HACK MIRROR(P/N 66 10)	67 3/8" X 30"
MARQUEE MIRROR(P/N 6579)	67" X 9 7/8"