PINBALL SERVICE BULLETIN #1
CHANGE ON SOLENOID DRIVER BOARD

TO PREVENT POSSIBLE 5 VOLT D.C. SUPPLY OSCILLATION INSTALL .01 DISC/100V. (MIN) AT C24 IN PARALLEL WITH 2 MFD @ 25 VOLT CAPACITOR.
PINBALL SERVICE BULLETIN #2
PROTECTION OF PLAYFIELD COILS

1. Un-Solder 18 GA. (Heavy) Yellow Wires From Drop Target Coils As Shown in Diagram (No. 1).
2. Install Single Fuse Clip in General Location (No. 2).
3. With a Continuity Tester Determine Which 18 GA. (Heavy) Wire Comes From Pin 6 of the 10 Point Connector on the Power Supply Board, Solder This Wire to One End of Fuse Clip (No. 3).
4. Solder Both, Jumper Wire From Other End of Fuse Clip (No. 4) and 18 GA. (Heavy) Yellow Jumper Wire Removed in Step 1, to Drop Target Coil (No. 1).
5. Un-Solder, Tape & Bury 18 GA. (Heavy) Yellow Wire From Flipper Coils (No. 5).
6. Solder New Wire From Fuse Clip (No. 2) With 18 GA. (Heavy) Yellow at (No. 3), Run Along Cable to Flipper Coils and Solder (No. 5). (IF ONLY ONE WIRE ADDED, ADD JUMPER BETWEEN THE FLIPPER COILS).
1. Install Fuse Clip in Approximate location as Illustrated.
2. Un-Solder The (Harness) Green Wire From The Chime Coil & Solder to One End of The Fuse Clip.
3. Solder Jumper Wire From Other End of Fuse to Terminal of Chime Coil Where Green Wire Was Removed.
4. Install 1/4 AMP Slo-Blow Fuse.
SERVICE BULLETIN #4
CHANGE ON PLAYFIELD

ON STINGRAY, TO INCREASE THE BONUS BUILD UP IT IS SUGGESTED THAT A CERAMIC DISC CAPACITOR BE ADDED TO THE LOWER ROLL-OVER BUTTON.
LINE VOLTAGE | STRAP TER. | APPLY VOLT
-------------|-----------|-------------
115          | 1 TO 3    | 9 TO 11    | 1 AND 9
120          | 1 TO 3    | 5 TO 7     | 1 AND 5
215          | 3 TO 9    | 1 AND 12   |
220          | 3 TO 5    | 1 AND 12   |
240          | 3 TO 5    | 1 AND 7    |

NOTE
STERN GAMES ARE ABLE TO BE OPERATED ON 215 VOLTS. BY USING THE TABLE ABOVE AND CHANGING THE STRAP BETWEEN TERMINALS, THE GAME WILL PERFORM EXCELLENTLY.
SERVICE BULLETIN

RE: DISPLAY PROBLEMS

IN REVIEWING OUR FIELD COMPLAINTS, AS WELL AS OUR INTERNAL QUALITY CONTROL REPORTS, THE MOST COMMON CAUSE OF FAILURE IN THE DA-100 MODULE HAS BEEN NARROWED TO TWO (2) COMPONENTS.

25-5-04-104  100K  5%  ¼W Resistor
25-5-04-304  300K  5%  ¼W Resistor

THEREFORE IT IS SUGGESTED BEFORE ATTEMPTING TO REPAIR ANY FAULTY DA-100 MODULE, THESE COMPONENTS BE INSPECTED FIRST AS THIS IS THE MOST LIKELY TO HAVE CAUSED THE PROBLEM.
SERVICE BULLETIN

#7

JUNE 7, 1978

BOARD LESS ROM'S C-433
BOARD WITH ROM'S C-433 & MODEL NO.

<table>
<thead>
<tr>
<th>LOC.</th>
<th>101 PINBALL</th>
<th>102 STINGRAY</th>
<th>103 STARS</th>
<th>104 MEMORY LANE</th>
</tr>
</thead>
</table>

SERVICE BULLETIN  
#7A  
OCTOBER 16, 1978

BOARD LESS ROM'S C-433  
BOARD WITH ROM'S C-433 & MODEL NO.

<table>
<thead>
<tr>
<th>LOC.</th>
<th>105 LECTRONAMO</th>
<th>105 WILD FYRE</th>
<th>108 NUGENT</th>
<th>109 DRACULA</th>
<th>110 TRIDENT</th>
<th>111 HOT HAND</th>
</tr>
</thead>
</table>

NOTE: ROM'S MUST BE USED IN SETS AS SHOWN FOR PROPER GAME OPERATION.
SERVICE BULLETIN #8

"STARS"

SWITCH 27 ON THE MPU BOARD MUST BE IN THE "ON" POSITION IF IT IS IN THE "OFF" POSITION, THE GAME WILL ONLY PUT ONE PLAYER UP.
1. Momentary ground selected coil (Point A), coil should energize.
2. Momentary ground selected terminal on jack J1, J2 or J5 (Point B) coil should energize.
3. Using game schematic, momentary ground metal tab on selected Q1 to 14 or 16 (Point C), coil should energize.
4. Locate TP6 (right side of Q19 on SDU Board). Clip one end of test cord to TP6 and momentary touch point D of selected Q1 to Q14 or 16 coil (see game schematic), Coil should energize, if not replace “Q” transistor being tested.
5. U1, U2 & U4 (CA3081) is a transistor array chip.

Using the game schematic to locate coil and corresponding Q1 to Q14 or 16 transistor, the chart can be used.

From the chart go to the correct transistor chip and ground base pin no. Coil should energize. If coil does not energize with base grounded and collector does not have 5 VDC, replace ship. If 5 VDC is present replace IN4004 diode (Point E) in circuit.
SERVICE BULLETIN #10

STERN MPU BOARDS WITHOUT GRID PATTERN USE ROM'S ONLY

STERN MPU BOARDS WITH THIS GRID PATTERN USE "E" PROMS ONLY

"E" PROMS WILL NOT PERFORM SATISFACTORILY IN NON PATTERN MPU BOARDS
ROM'S WILL NOT PERFORM SATISFACTORILY IN GRID PATTERN BOARDS
SERVICE BULLETIN #10A

2716 MPU BOARD MEMORY USE

For use with 2716 E-PROMS Grid Pattern Boards Have:

1) E13 jumper to E12 instead of E11
   (connects U18 pin 4 to U2 pin 18 and U6 pin 18)

2) E16 jumper to E14 instead of E15
   (connects +5 volts to U2 pin 21 and U6 pin 21)

For use with 2316 ROMS The Following Jumper Changes Must Be Made:

1) E13 jumper to E11 instead of E12
   (connects U18 pin 5 to U2 pin 18 and U6 pin 18)

2) E16 jumper to E15 instead of E14
   (connects U18 pin 15 (A9) to U2 pin 21 and U6 pin 21)
NOTE:

OBSERVE POLARITY:

1. Point A is the foil connected to Pin 10 of U6
2. Point B is the "+" lead of C-50
3. Point C is the "-" lead of C-52

REMEDY:
Modification to SB-100 REV A and SB-100 REV B.

1. Remove the wire between pin 25 of J1 on the Sound Board and pin 25 (RESET) of J5 on the MPU board. (or clip pin 25 on J1 Connector on the Sound Board).

2. On the bottom of the board solder a 47K OHM, 1/4 watt resistor between points A and B as shown in Fig. 2.

3. On the bottom of the board solder a 3.3F, 6 volt tantalum capacitor between points A and C as shown in Fig. 2.

This will correct bookkeeping errors resulting from mischievous multiple toggling of the power switch.
To Lower The Frequency of Tones Change The Following:

R2, R6, R13, 5K OHM To 25A-16-4 25K OHM
Trim Pot R
R12 2.2K OHM To 25A-5-04-822 8.2K OHM 1/4 WATT R.

Test Point Frequency Adjustment
TP2- R6 ADJ.  138 Hz ± 3Hz
TP3- R2 ADJ.  104 Hz ± 3Hz
TP5- R13 ADJ.  172 Hz ± 3Hz
SERVICE BULLETIN
#14

5 VDC REGULATOR
NOTE:
CHECK FUSE ON TA-F3 (4 AMP)

IF FUSE IS BAD AND BLOWS AFTER REPLACING:

1) Disconnect one end of C-23 (11,700 μfd) and replace fuse. If fuse doesn't blow replace C-23.

2) With C-23 dis-connected and fuse still blows, disconnect C-29 (.01 μfd) and C-24 (2 μfd 20 WVDC) with OHM-meter check if C-29 BY ITSELF reads shorted replace it. If C-24 BY ITSELF does not read approx. 100,000 replace it.

3) With C-23, C-24 & C-29 dis-connected and fuse still blows replace Q-20 (+5 VDC) voltage regulator.
PLUG MPU, LDA & DA BOARDS BACK IN ONE AT A TIME WHILE READING THE +5VDC LINE TO FIND WHICH BOARD IS CAUSING THE PROBLEM.

CHECK RESISTANCE OF R50 (4.7Ω) - IF HIGH, REPLACE.

CHECK TP1 (+5VDC)

- REPLACES C25 (.1 ufd) AND CHECK TP1 (+5VDC)

- REPLACES Q-20 (+5VDC) VOLTAGE REGULATOR & CHECK TP1 (+5VDC)

Q-20 (+5 VDC) REGULATOR.

* ON EARLY SDU BOARDS, C-29 IS SOLDERED ON TOP OF C-24.
## COMPONENT PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REFERENCE DESIGNATION</th>
<th>STERN PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A1</td>
<td>A-434</td>
<td>DISPLAY DRIVER MODULE, COMPLETE</td>
</tr>
<tr>
<td>2</td>
<td>DS1</td>
<td>25C-17-1</td>
<td>DIGITAL DISPLAY PANEL</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>4C-226</td>
<td>DISPLAY MOUNTING</td>
</tr>
<tr>
<td>4</td>
<td>Q7 THRU Q12</td>
<td>25A-2-5401</td>
<td>TRANSISTOR, 2N-5401</td>
</tr>
<tr>
<td>5</td>
<td>Q1 THRU Q6</td>
<td>25A-2-1</td>
<td>TRANSISTOR, MPS-A42 OR 7613</td>
</tr>
<tr>
<td>6</td>
<td>Q13 THRU Q19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>C1</td>
<td>25A-261</td>
<td>CAPACITOR, AXIAL 0.1 MFD, 50V.</td>
</tr>
<tr>
<td>8</td>
<td>C2</td>
<td>25A-12-7</td>
<td>CAPACITOR, 0.1 MFD, 500V.</td>
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<tr>
<td>9</td>
<td>CR1</td>
<td>25A-1-1</td>
<td>ZENER DIODE, 110V., 1W, IN3045</td>
</tr>
<tr>
<td>10</td>
<td>U1</td>
<td>25A-MC14543B</td>
<td>I.C. DECODER, 14543B</td>
</tr>
<tr>
<td></td>
<td>J1</td>
<td>4B-215-10</td>
<td>(2) 10 PIN WAFER CONNECTORS</td>
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<tr>
<td></td>
<td>R1, R3, R5, R7, R9, R11, R34</td>
<td>25A-5-104-104</td>
<td>RESISTOR, 100K, 1/4 WATT</td>
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<tr>
<td></td>
<td>R2, R4, R6, R8, R10, R12</td>
<td>25A-5-04-222</td>
<td>RESISTOR, 2.2K, 1/4 WATT</td>
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<tr>
<td></td>
<td>R13, R15, R17, R19, R21</td>
<td>25A-5-04-912</td>
<td>RESISTOR, 9.1K, 1/4 WATT</td>
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<tr>
<td></td>
<td>R23, R25</td>
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</tr>
<tr>
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<td>R14, R16, R18, R20, R22, R24</td>
<td>25A-5-04-304</td>
<td>RESISTOR, 300K, 1/4 WATT</td>
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<td>R26, R35, R36, R37, R38, R39, R40</td>
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<td>RESISTOR, 1K, 1/4 WATT</td>
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<tr>
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<td>R27, R28, R29, R30, R31, R32</td>
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<td></td>
</tr>
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<td>R33</td>
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<td></td>
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<td></td>
<td>R41</td>
<td>25A-5-04-393</td>
<td>RESISTOR, 39K, 1/4 WATT</td>
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<td>R42</td>
<td>25A-5-04-244</td>
<td>RESISTOR, 240K, 1/4 WATT</td>
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<td>R43 THRU R48</td>
<td>25A-5-04-822</td>
<td>RESISTOR, 8.2K, 1/4 WATT</td>
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<tr>
<td></td>
<td>R49 THRU R54</td>
<td>25A-5-04-203</td>
<td>RESISTOR, 20K, 1/4 WATT</td>
</tr>
</tbody>
</table>
### Fig. 1

<table>
<thead>
<tr>
<th>TRANSISTOR</th>
<th>7613-OR LEVEL SHIFTER</th>
<th>MPSA42 SHIFTER</th>
<th>2N 5401 DIGIT DRIVERS</th>
<th>100 KΩ COLLECTOR RESISTOR</th>
<th>8.2 KΩ BASE RESISTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6 Q5 Q4 Q3 Q2 Q1</td>
<td>Q12 Q11 Q10 Q9 Q8 Q7</td>
<td>R11 R9 R7 R5 R3 R1</td>
<td>R12 R10 R8 R6 R4 R2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Fig. 2

- **E** = Emitter
- **B** = Base
- **C** = Collector

### Fig. 3

**Check Test Points**:

- **TP-1** + 5 VDC
- **TP-2** + 185 VDC (See Page 6)
- **TP-3** Ground
Fig. 4

Fig. 5

<table>
<thead>
<tr>
<th>SEGMENT</th>
<th>SEGMENT DRIVER TRANSISTOR</th>
<th>EMMITER RES.</th>
<th>COL. RES.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Q13</td>
<td>R33</td>
<td>R13</td>
</tr>
<tr>
<td>b</td>
<td>Q14</td>
<td>R32</td>
<td>R15</td>
</tr>
<tr>
<td>c</td>
<td>Q15</td>
<td>R31</td>
<td>R19</td>
</tr>
<tr>
<td>d</td>
<td>Q16</td>
<td>R30</td>
<td>R19</td>
</tr>
<tr>
<td>e</td>
<td>Q17</td>
<td>R29</td>
<td>R21</td>
</tr>
<tr>
<td>f</td>
<td>Q18</td>
<td>R28</td>
<td>R21</td>
</tr>
<tr>
<td>g</td>
<td>Q19</td>
<td>R27</td>
<td>R25</td>
</tr>
</tbody>
</table>

Fig. 6
ONE DIGIT ALWAYS ON

GO TO DIGIT DRIVER CORRESPONDING WITH DIGIT THAT IS ON (SEE FIG. 1 or SCHEMATIC)

UNPLUG JACK (J1) AND DISCONNECT BASE (SEE FIG. 2) OF DIGIT DRIVER. PLUG JACK (J1) BACK IN

DIGIT STILL ON

UNPLUG JACK (J1) AND REPLACE DIGIT DRIVER PLUG JACK BACK IN

DIGIT STILL ON

BAD DIGITAL DISPLAY PANEL

DIGIT OFF

REPLACE CORRESPONDING LEVEL SHIFTER (SEE FIG. 1 or SCHEMATIC)

IF STILL ON

BAD U1
ONE DIGIT ALWAYS OFF OR WEAK

PUT MACHINE IN DISPLAY SELF TEST
(PRESS SELF TEST SWITCH 2 TIMES)
THEN GO TO LEVEL SHIFTER TRANSISTOR
CORRESPONDING WITH DIGIT THAT IS OUT
(SEE FIG. 1 or SCHEMATIC)

MOMENTARILY
SHORT Emitter TO COLLECTOR OF LEVEL SHIFT TRANSISTOR (SEE FIG. 2)

DIGIT GOES ON

JUMP ACROSS BASE RESISTOR
WITH A GOOD 8.2K RESISTOR*  
(SEE FIG. 1 & 3)

DIGIT STAYS OFF

REPLACE LEVEL SHIFTER TRANSISTOR

DIGIT COMES ON

REPLACE BASE RESISTOR

DIGIT STILL OFF

JUMP ACROSS COLLECTOR RESISTOR WITH A GOOD 100K RESISTOR (SEE FIG. 1 & 3)

DIGIT STILL OFF

REPLACE CORRESPONDING DIGIT DRIVER (SEE FIG. 1)

IF STILL OFF

BAD DIGITAL DISPLAY PANEL

DIGIT COMES ON

REPLACE COLLECTOR RESISTOR

*NOTE: EARLIER SCHEMATICS MAY HAVE 9.1K CALLED OUT
ALL DIGITS OFF

CHECK VOLTAGE TP2 OF DA (SHOULD BE + 185 VDC ± 5 VDC*)

IF VOLTAGE IS LOW
- DISCONNECT J1 & CHECK VOLTAGE ON PIN 1 OF FEMALE CONNECTOR (SHOULD BE + 185 vdc)
  IF OK
  DISCONNECT ONE SIDE OF C2 (.01 UFD) & PLUG J1 BACK IN CHECK VOLTAGE ON TP2 (185 VDC)
  IF OK
  REPLACE C2 (.01 UFD)
  IF LOW
  PROBLEM IN WIRING OF HIGH VOLTAGE SUPPLY (SDU)

IF OK
- MOMENTARILY SHORT EMITTER TO COLLECTOR OF Q19 (SEE FIG. 2). “G” SEGMENT SHOULD COME ON. (CAUTION — DO NOT TOUCH UNDER SIDE OF BOARD WITH POWER ON)

IF SEGMENT COMES ON
- BAD IC U1

IF SEGMENT DOES NOT COME ON
- BAD DIGITAL DISPLAY PANEL

UNPLUG J1 & DISCONNECT ONE SIDE OF VR1 (ZENER), PLUG J1 BACK IN & CHECK TP2 (185 VDC)

IF VOLTAGE IS 185 VDC
- REPLACE VR1 (ZENER)

*NOTE: EARLIER SCHEMATICS MAY HAVE CALLED OUT 175 VDC
ALL DIGITS WEAK

1) CHECK 185 VDC (TP2 ON LDA)

2) IF OK REPLACE VR1

3) IF ALL DIGITS STILL WEAK, BAD DIGITAL DISPLAY PANEL
ONE SEGMENT ALWAYS ON

DETERMINE WHICH SEGMENT DRIVER (Q13 THRU Q19) CONTROLS SEGMENT. (SEE FIG. 5 or SCHEMATIC)

UNPLUG DA JACK (J1)

DISCONNECT BASE OF SEGMENT DRIVER & PLUG J1 BACK IN (SEE FIG. 2)

IF SEGMENT STILL ON
REPLACE SEGMENT DRIVER

IF STILL ON
BAD DIGITAL DISPLAY PANEL

IF SEGMENT OFF
REPLACE IC U1
ONE SEGMENT ALWAYS OFF OR WEAK

Determine which segment driver (Q13 thru Q19) controls the segment that is off. (See Fig. 5 or Schematic)

Momentarily short emitter to collector of segment driver. (See Fig. 2) (Caution do not touch underside of board with power on.)

If segment goes on

Momentarily short base of segment driver to +5 Vdc (TP1 of DA) (See Fig. 2)

If segment does not go on

Replace segment driver

If segment goes on

Replace IC U1

If segment does not go on

Short ground (TP3 of DA) to collector of segment driver (see Fig. 2)

If segment goes on

Replace emitter resistor (see Fig. 4 or 5)

If segment does not go on

Short across collector resistor (see Fig. 4 or 5)

If segment goes on

Replace collector resistor

If segment does not go on

Bad digital display panel
DA COUNTS WRONG

CHECK + 5 VDC ON PIN 16 OF IC U1

IF WRONG
TURN POWER OFF AND CHECK CONTINUITY BETWEEN PIN 20 OF J1 CONNECTOR & PIN 16 OF IC U1 SEE DWG. BELOW

IF OK
TAKE RESISTANCE READINGS BETWEEN IC U1 PINS 1 THRU 5 & RESPECTIVE PINS OF J1 CONNECTOR (0Ω ON TWO SIDED BOARDS — COPPER ON BOTH SIDES. 20,000 Ω ON ONE SIDED BOARD — COPPER ON ONE SIDE ONLY) SEE DWG. BELOW

IF OK
REPLACE IC U1

IF NOT CORRECT
CHECK FOR OPEN COPPER FOIL OR BAD RESISTOR (RESISTOR ONE SIDED BOARD ONLY) SEE DWG. BELOW

BROKEN & JUMPER ON 1-SIDED BOARDS
DIRECT ON TWO SIDED BOARDS

ADDED 20,000 Ω RESISTOR ON 1-SIDED BOARDS (COPPER ON 1-SIDE ONLY) TO PREVENT BAD I.C. (UI) FROM AFFECTING OTHER DISPLAYS.
SERVICE BULLETIN No. 16
"HOT HAND"

It is recommended that a 1.5 M.F.D. - 250 Volt Non Polarized Capacitor be added across the terminals of the motor to reduce a possible Inductive Load.
The above change allows center chute to have a max. of 15 plays per coin.
B - 431 LAMP DRIVER MODULE

PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REFERENCE DESIGNATION</th>
<th>STERN PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>B-431</td>
<td>LDA-100 REV. &quot;B&quot; 1-SIDED P.C. BOARD COMPLETE</td>
</tr>
<tr>
<td>2</td>
<td>R-1 THRU R-60 &amp; R-70</td>
<td>25A-5-04-222</td>
<td>2.2K OHM 1/4 WATT RESISTOR</td>
</tr>
<tr>
<td>3</td>
<td>R-61 THRU R-69</td>
<td>25A-5-04-225</td>
<td>2.2M OHM 1/4 WATT RESISTOR</td>
</tr>
<tr>
<td>4</td>
<td>R-71 THRU R-79</td>
<td>25A-5-04-203</td>
<td>20K OHM 1/4 WATT RESISTOR</td>
</tr>
<tr>
<td>5</td>
<td>C-1</td>
<td>25A-26-1</td>
<td>0.01 MFD. 50V. AXIAL CAPACITOR</td>
</tr>
<tr>
<td>6</td>
<td>Q1-Q3, Q8-Q10, Q15-Q17, Q22-Q24, Q33-Q35, Q40-Q42, Q47-Q49, Q54-Q56</td>
<td>25A-2-3</td>
<td>MCR-106-1 THYRISTOR (SUB. C106Y1)</td>
</tr>
<tr>
<td>7</td>
<td>Q4-Q7, Q11-Q14, Q18-Q21, Q25-Q32, Q36-Q39, Q43-Q46, Q50-Q53, Q57-Q60</td>
<td>25A-2-5060</td>
<td>2N5060 THYRISTOR</td>
</tr>
<tr>
<td>8</td>
<td>U1 THRU U4</td>
<td>25A-MC 14514B</td>
<td>MC 14514B 10F 16 DECODER</td>
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<tr>
<td>9</td>
<td>J4</td>
<td>4B-212-17</td>
<td>17 PIN WAFER CONNECTOR KK-100 SERIES</td>
</tr>
<tr>
<td>10</td>
<td>J2</td>
<td>4B-212-23</td>
<td>23 PIN WAFER CONNECTOR KK-100 SERIES</td>
</tr>
<tr>
<td>11</td>
<td>J1 &amp; J3</td>
<td>4B-212-28</td>
<td>28 PIN WAFER CONNECTOR KK-100 SERIES</td>
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</tbody>
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NOTE:
FIND RESISTOR LOCATION ON P.C. BOARD & IT'S VALUE ON SCHEMATIC.
# B-432 SOLENOID DRIVER VOLTAGE REGULATOR MODULE
## PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REFERENCE DESIGNATION</th>
<th>STERN PART NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1 A3</td>
<td>B-432</td>
<td></td>
<td>SOLENOID DRIVER/VOLTAGE REGULATOR MODULE, COMPLETE</td>
</tr>
<tr>
<td>2 RT1</td>
<td>25A-16-1</td>
<td></td>
<td>POT. (LINEAR) 25K</td>
</tr>
<tr>
<td>3 C25</td>
<td>25A-12-11</td>
<td></td>
<td>(CERAMIC) CAPACITOR, .1 MFD, 50V.</td>
</tr>
<tr>
<td>4 C26</td>
<td>25A-13-3</td>
<td></td>
<td>CAPACITOR, 160 MFD 350V.</td>
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<tr>
<td>5 C24</td>
<td>25A-13-2</td>
<td></td>
<td>CAPACITOR, 2 MFD 50V.</td>
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<tr>
<td>6 C23</td>
<td>25A-13-4</td>
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<td>CAPACITOR, 11700 MFD, 20V.</td>
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<tr>
<td>7 C1-C8, C11-C21</td>
<td>25A-12-4</td>
<td></td>
<td>CAPACITOR, .002 MFD, 1KV</td>
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<tr>
<td>8 C22, C27, C28, C29</td>
<td>25A-12-7</td>
<td></td>
<td>CAPACITOR, .01 MFD, 500V.</td>
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<tr>
<td>9 K1</td>
<td>25A-7-1 or 25A-7-2</td>
<td></td>
<td>RELAY</td>
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<td>10 Q1-Q19</td>
<td>25A-2-2</td>
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<td>TRANSISTOR, SE9302</td>
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<td>11 Q22, Q23</td>
<td>25A-2-3440</td>
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<td>12 Q21</td>
<td>25A-2-3584</td>
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<tr>
<td>13 Q20</td>
<td>25A-LM-323-K</td>
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<td>+ 5V REGULATOR, LAS1405 or 78H05KC or LM323K</td>
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<tr>
<td>14 CR1-CR21</td>
<td>25A-1-4004</td>
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<td>DIODE (IN4004)</td>
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<tr>
<td>15 VR1</td>
<td>25A-1-5275 A</td>
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<td>DIODE, ZENER 140V, IN5275 A</td>
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<td>16 U1, U3, U4</td>
<td>25A-70-1</td>
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<td>I.C. TRANSISTOR, ARRAY CA3081</td>
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<tr>
<td>17 U2</td>
<td>25A-DM74L154</td>
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<td>I.C. BINARY TO 1/16 DECODER, 74L154</td>
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<tr>
<td>18 FOR K1</td>
<td>25A-8-1</td>
<td></td>
<td>RELAY SOCKET</td>
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<td>19 FOR K1</td>
<td>25A-8-C1</td>
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<td>RELAY CLIP</td>
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<td>20 USED ON Q23</td>
<td>25A-2H-2</td>
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<td>HEAT SINK T018</td>
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<td>21 USED ON Q21</td>
<td>25A-2H-3</td>
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<td>HEAT SINK T066</td>
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<td>22 USED ON Q20</td>
<td>25A-2H-1</td>
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<td>HEAT SINK T03 CASE</td>
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<tr>
<td>23 J2</td>
<td>4B-215-15</td>
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<td>15 PIN WAFER CONNECTOR</td>
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<td>24 J4</td>
<td>4B-212-12</td>
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<td>12 PIN WAFER CONNECTOR</td>
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<td>25 J3</td>
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<td>26 J1</td>
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<td>9 PIN WAFER CONNECTOR</td>
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<td>27 A201</td>
<td>4A-201</td>
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<td>SHIELD-PLEXIGLASS</td>
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<tr>
<td>28 F1</td>
<td>8A-178-P25</td>
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<td>FUSE 1/4 AMP, 250V.</td>
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### COMPONENT PARTS LIST

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<thead>
<tr>
<th>ITEM</th>
<th>DESIGNATION</th>
<th>PART NO.</th>
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<tbody>
<tr>
<td>1</td>
<td>A1</td>
<td>A-434</td>
<td>DISPLAY DRIVER MODULE, COMPLETE</td>
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<tr>
<td>2</td>
<td>DS1</td>
<td>25C-17-1</td>
<td>DIGITAL DISPLAY PANEL</td>
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<td>3</td>
<td>Q7 THRU Q12</td>
<td>25A-2-5401</td>
<td>DISPLAY MOUNTING</td>
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<tr>
<td>4</td>
<td>Q13 THRU Q19</td>
<td>25A-2-1</td>
<td>TRANSISTOR, 2N-5401</td>
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<td>6</td>
<td>C1</td>
<td>25A-26-1</td>
<td>TRANSISTOR, MPS-A42</td>
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<td>7</td>
<td>C2</td>
<td>25A-12-7</td>
<td>CAPACITOR, AXIAL .01 MFD, 50V.</td>
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<td>8</td>
<td>CR1</td>
<td>25A-1-1</td>
<td>CAPACITOR, 01. MFD, 500V.</td>
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<td>9</td>
<td>U1</td>
<td>25A-MC14543B</td>
<td>ZENER DIODE, 110V., 1W, IN3045</td>
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<td>10</td>
<td>J1</td>
<td>4B-215-10</td>
<td>I.C. DECODER, 14543B</td>
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<tr>
<td></td>
<td>R1,R3,R5,R7,R9,R11,R34</td>
<td>25A-5-04-104</td>
<td>(2) 10 PIN WAFFER CONNECTORS</td>
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<tr>
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<td>R2,R4,R6,R8,R10,R12</td>
<td>25A-5-04-222</td>
<td>RESISTOR, 100K, 1/4 WATT</td>
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<td></td>
<td>R13,R15,R17,R19,R21</td>
<td>25A-5-04-912</td>
<td>RESISTOR, 2.2K, 1/4WATT</td>
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<td>R23,R25</td>
<td>25A-5-04-304</td>
<td>RESISTOR, 9.1K, 1/4 WATT</td>
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<td>R14,R16,R18,R20,R22,R24</td>
<td>25A-5-04-102</td>
<td>RESISTOR 300K, 1/4 WATT</td>
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<td>R26,R35,R36,R37,R38,R39,R40</td>
<td>25A-5-04-393</td>
<td>RESISTOR, 1K, 1/4 WATT</td>
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<td>R27,R28,R29,R30,R31,R32</td>
<td>25A-5-04-244</td>
<td>RESISTOR 39K, 1/4 WATT</td>
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<td>R33</td>
<td>25A-5-04-822</td>
<td>RESISTOR, 240K 1/4 WATT</td>
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<td>R41 THRU R48</td>
<td>25A-5-04-203</td>
<td>RESISTOR, 8.2K, 1/4 WATT</td>
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<td>R49 THRU R54</td>
<td>25A-5-04-203</td>
<td>RESISTOR, 20K, 1/4 WATT</td>
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</table>
COMPLETE FRONT DOOR ASSEMBLY D-490-2
COIN CHUTE HOUSING ASSEMBLY

B-489-N NICKEL
B-489-D DIME
B-489-Q QUARTER
SPECIFY COIN

A-454-2 WITH 2 COIN CHUTE (SHOWN)
A-454-3 WITH 3 COIN CHUTE

COIN LOCKOUT RELAY ASSEMBLY
A-459

B-489-N NICKEL
B-489-D DIME
B-489-Q QUARTER
SPECIFY COIN

4-36 X 3/4" LG. S. R. HD. M. S.
3A-143

6-32 X 1/2" LG. S. R. HD. SEMS
IA-192

8A-114-N NICKEL
8A-114-D DIME
8A-114-Q QUARTER
SPECIFY COIN

2A-146
14A-259
RED OR AMBER

4A-258
RED OR AMBER

4A-119
RED OR WHITE

2A-200

When ordering specify colors for A, B, C.
FLIPPER ASSEMBLY
B-195-L-1 LEFT
B-195-R-1 RIGHT

7A-121 (SPECIFY COLOR)
4B-122-W
A-192
1B-309-L OR R
SW-294-BL OR BR *
17A-123
4X5/8 LG. S.M.S."B"

A-186

6-32X1/2 TYPE 23 S.T.S.

17A-122
4A-172
4A-111-W-1
A-191-L
OR R
A-197
3A-113
6A-199

SPECIFY COIL

25A-1-4004
5A-151

10-32 CUP POINT SET SCREW

*SOME ASSEMBLIES USE ADDITIONAL SWITCH SW-481 (WITH PUSHER)
SLING SHOT ASSEMBLY

NOTE:
TWO A-184-1 CONTACT SWITCH & BRACKET ASSEMBLY USED PER SLING SHOT (CONTACT SWITCH PART NO. SW-462)
COMPLETE DROP TARGET ASSEMBLY D-393-3-L (SHOWN)
D-393-3-R WITH COIL MOUNTED ON OPPOSITE END

D I O D E
25A-I-4004

8-32X3/8" S.R. HD. SEMS

IB-485-3

2A-231

IB-481-3

IB-616-3

IB-482-L

IB-482-R

IB-482-3

2A-225-3

2A-230

17A-104-X21

17A-104-21

A-378

2A-232

17A-104-X21

17A-104-25

A-375

13A-11

SPECIFY COLOR

17A-104-25

5A-171

IA-491

10-32X3/8" SOC. HD. CAP SCREW

IB-480-3

SW-471

25A-I-4004

17A-123

17A-123

5-40X5/8" S.R. HD. M.S.
BALL EJECTOR
WIRE FORM ASSEMBLY
A-150

RETURN LANE
WIRE FORM ASSEMBLY
A-149

OUT LANE
WIRE FORM ASSEMBLY
A-383

ROLL OVER BUTTON ASSEMBLY
FLIPPER BUTTON ASSEMBLY

ROLL OVER BUTTON ASSEMBLY
A-181
COMPLETE (INCLUDES 5 ITEMS UNDER LINED)
CONTACT SWITCH ASSEMBLIES

FLIPPER SWITCH
SW-294-BL
SW-294-BR

BALL KICKOUT SWITCH
SW-467

ROLL OVER WIRE FORM SWITCH
SW-458

SPINNER SWITCH
SW-468

BALL EJECTOR SWITCH
SW-459

CREDIT BUTTON SWITCH
SW-469

ROLL OVER BUTTON SWITCH
SW-460

DROP TARGET BANK SWITCH
SW-471

TILT SWITCH
SW-461

STAND-UP TARGET SWITCH
SW-472

ACTION KICKER SWITCH
SW-462

DROP TARGET BANK SWITCH
SW-473
FLIPPER BUTTON SWITCH
SW-474

ELEVATOR TILT SWITCH
SW-475

THUMPER BUMPER SWITCH
SW-476

ROLL OVER BUTTON SWITCH
SW-477

ROLL OVER BUTTON SWITCH
SW-477-1

SPINNER SWITCH
SW-479

RIGHT FLIPPER (NUGENT)
SW-481
COMPLETE DROP TARGET ASSEMBLY D-393-5

- 17A-123
- 5-40x 5/8" LG. S.R. HD. M.S.
- IB-482-R
- IB-482-L
- IB-485-5
- 25A-1-4004
- B-27-2300
- 2A-231
- 1A-486
- 8-32x3/8" LG. S.R. HD. SEAMS
- A-398
- 17A-104-X21
- 17A-104-25
- 17A-104-X21
- 10-32x3/8" LG. SOC. HD. CAP SCR.
- 17A-123
- 25A-1-4004 DIODE
- 5-40x 5/8" LG. S.R. HD. M.S.
- IA-580
- SW-473
- IB-481-5
- 25A-1-4004
- IB-483-5
- IB-482-R
- 2A-231
- A-375
- 17A-104-X21
- 2A-225-5
- 13A-9
- 17A-104-25
- 5A-171
- 2A-230
- IB-480-5
- SW-471
- 25A-1-4004 DIODE
- 17A-123
- 5-40x 5/8" LG. S.R. HD. M.S.
COMPLETE DROP TARGET ASSEMBLY C-387-2 & C-387-3

NOTE: * ITEMS USED ON C-387 ONLY
ITEMS UNDERLINED USED ON C-387-3 ONLY
ALL OTHER ITEMS ARE COMMON
COMPLETE 4 TONE CHIME ASSEMBLY C-428-4

6X1" LG. P.R. HD. S.M.S. TYPE "A"
3A-102
7A-107
IA-548-4
IA-548-1
IA-548-2
IA-548-3
4A-125-6
23B-2-4
IA-271

N-31-2000
DIODE 25A-1-4004
4A-159-1
1A-548-1
B-427-4
A-300-1

DIODE 25A-1-4004
23B-2-4
7A-101
KNOCKER ASSEMBLY A-435

1A-552

4A-159

N-26-1200

25A-1-4004 DIODE

1A-178

7A-101

3A-137

A-440

1/4-20 HEX NUT

1/4-20 X 5" LONG CARRIAGE BOLT

A-135
DOUBLE SPIN TARGET ASSEMBLY

SPIN TARGET ASSEMBLY
LEG & LEVELER

LEG LEVELER
17A-127 (2" LG.)
17A-135 (3" LG.)

IC-333 LEG

IC-263-1 TO-4 COVER

ID-297 CASH BOX

CASH BOX & COVER
PIN UNIT ARM

COMPLETE PIN UNIT LIFT ARM ASSEMBLY
PINS #1 THRU #10
B-485-C

PIN UNIT LIFT ARM & HINGE ASSEMBLY
PINS #1 THRU #10
B-485

INDIVIDUAL BREAKDOWN

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>4A-151</td>
<td>NYLON ROLLER</td>
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<tr>
<td>2</td>
<td>2A-257</td>
<td>ROLLER PIN</td>
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<tr>
<td>3</td>
<td>17A-104-15</td>
<td>RETAINING RING</td>
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<tr>
<td>4</td>
<td>5A-130</td>
<td>SPRING</td>
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<td>5</td>
<td>1A-609</td>
<td>PIN HINGE BRACKET</td>
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<tr>
<td>6</td>
<td>6A-166-6</td>
<td>1/16 DIA. × 3/8 LG. COTTER PIN</td>
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<td>1A-350</td>
<td>#6-32 × 1/4 LG. SEMS UNIT</td>
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<td>A-479</td>
<td>PIN RETAINER</td>
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<td>A-484</td>
<td>PIN SWIVEL HINGE ASS'Y.</td>
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<td>A-484</td>
<td>PIN LIFT ARM ASS'Y.</td>
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<td>18A-123</td>
<td>BRASS RIVET</td>
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<td>17A-152</td>
<td>COMPRESSION RING</td>
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<td>2A-306</td>
<td>SPRING RETAINER PIN</td>
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<td>3A-108</td>
<td>WASHER</td>
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<td>6A-167-8</td>
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<td>1A-715</td>
<td>SPRING MTG. BRACKET</td>
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**Diagram:**

- **1A-620** REBOUND RUBBER RETAINER
- **2B-265** PUCK
- **4A-261-1** PUCK RETURN CUSHION
- **7A-130-2** REBOUND RUBBER
- **4A-304** NYLINER SLEEVE
- **B-606** MOTOR LINK
- **7A-132-1** SIDE RAIL
- **1A-619** REBOUND RUBBER RETAINER
## Item | Part No. | Description
--- | --- | ---
1 | A-476 | STABILIZER BRKT. ASS'Y.
2 | A-475 | STABILIZER ARM ASS'Y.
3 | 17A-104-X31 | RETAINING RING
4 | 2A-252 | PIN RESET BAR (#7-8-9-10)
5 | 5A-155 | SPRING
6 | B-606 | MOTOR LINK ASS'Y.
7 | 17A-153 | RETAINING RING
8 | 2A-254 | PIN RESET BAR (#4-5-6)
9 | 2A-255 | PIN RESET BAR (#2 & 3)
10 | 8A-173 | FLOURESCENT LAMP
11 | 2A-256 | PIN RESET BAR (#1)
12 | 25A-16-2 | POTENTIOMETER 25K LINEAR
13 | 8A-175 | FLOURESCENT LAMP STARTER
14 | 8A-177 | BALLAST
15 | 8A-172-1 | SPEAKER
16 | B-499 | RESET MOTOR ASS'Y.
17 | 6A-165-1 | #8-32 x 5/16 LONG. SLOTTED HEX HD. SET SCREW
18 | 16B-5 | RESET WIRE FORM
19 | 17A-153 | RESET MOTOR TRANSFORMER
## Slide Action Pin Unit Assembly

<table>
<thead>
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<td>C-496</td>
<td>Complete Slide Action Pin Unit Assembly</td>
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<tr>
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<td>3A-136</td>
<td>#10-32 x 3/8&quot; LG. R.H.M.S. (Brass)</td>
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<td>3A-100</td>
<td>Split Type Lockwasher</td>
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<td>4</td>
<td>A-478</td>
<td>Brass Washer</td>
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<td>5A-105</td>
<td>Frame and Eyelet Sub Assembly</td>
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<td>6</td>
<td>A-477</td>
<td>Spring</td>
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<td>7</td>
<td>L-28-600</td>
<td>Armature and Sleeve Assembly</td>
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<td>B-485</td>
<td>Life, Swivel Hinge Bracket Ass'y. (See Opposite Page)</td>
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<td>9</td>
<td>A-480</td>
<td>Reset Bracket Assembly</td>
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<td>2A-257</td>
<td>Lift Arm Hinge Pin</td>
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<td>3A-169</td>
<td>Lift Arm Stop</td>
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<td>12</td>
<td>17A-104-15</td>
<td>Retaining Ring</td>
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<tr>
<td>13</td>
<td>B-498</td>
<td>Pin Frame Ass'y.</td>
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<tr>
<td>14</td>
<td>18A-130</td>
<td>Eyelet (Used as Reinforcement)</td>
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<td>4B-247</td>
<td>Pin</td>
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<td>4A-150</td>
<td>Lift Arm Stop</td>
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<tr>
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<td>B-485-C</td>
<td>Complete Lift Arm Swivel Hinge Assembly (See Opposite Page)</td>
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<tr>
<td>18</td>
<td>17A-115</td>
<td>Push on Tinnerman Unit</td>
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