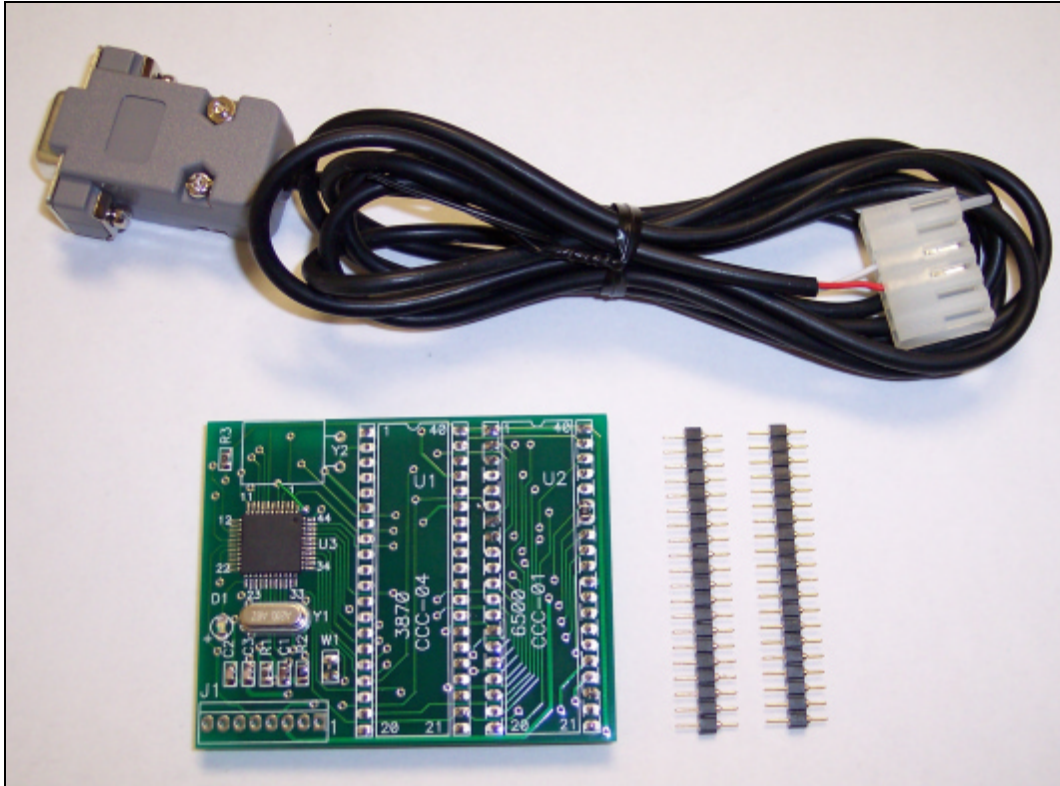


# REPAIRING ROWE/AMI R84 - R88 CENTRAL CONTROL COMPUTERS

*Using The Jukebox Troubleshooter ...*



- Comes with two 20-pin strip headers and PC serial cable
- Uses a PC serial port for interactive control
- Full memory IC diagnostics and battery check
- Performs continuous record mechanism testing
- Verify LED display digits and indicators
- Outputs stationary signals for voltmeter troubleshooting
- Test operation of all push-button and slide switches
- Displays coin switch activity
- Locates and identifies intermittent connections
- Shows mechanism INDEX and HOME signal timing
- Check pricing board configuration and program cards
- Increment Play counter and Money counter
- Manual has tips, charts, voltage readings and schematics
- 99% of all board components tested, except crystal Y100



**Data Sync Engineering**  
P.O. Box 539, 2 Footbridge Lane  
Blairstown, New Jersey 07825

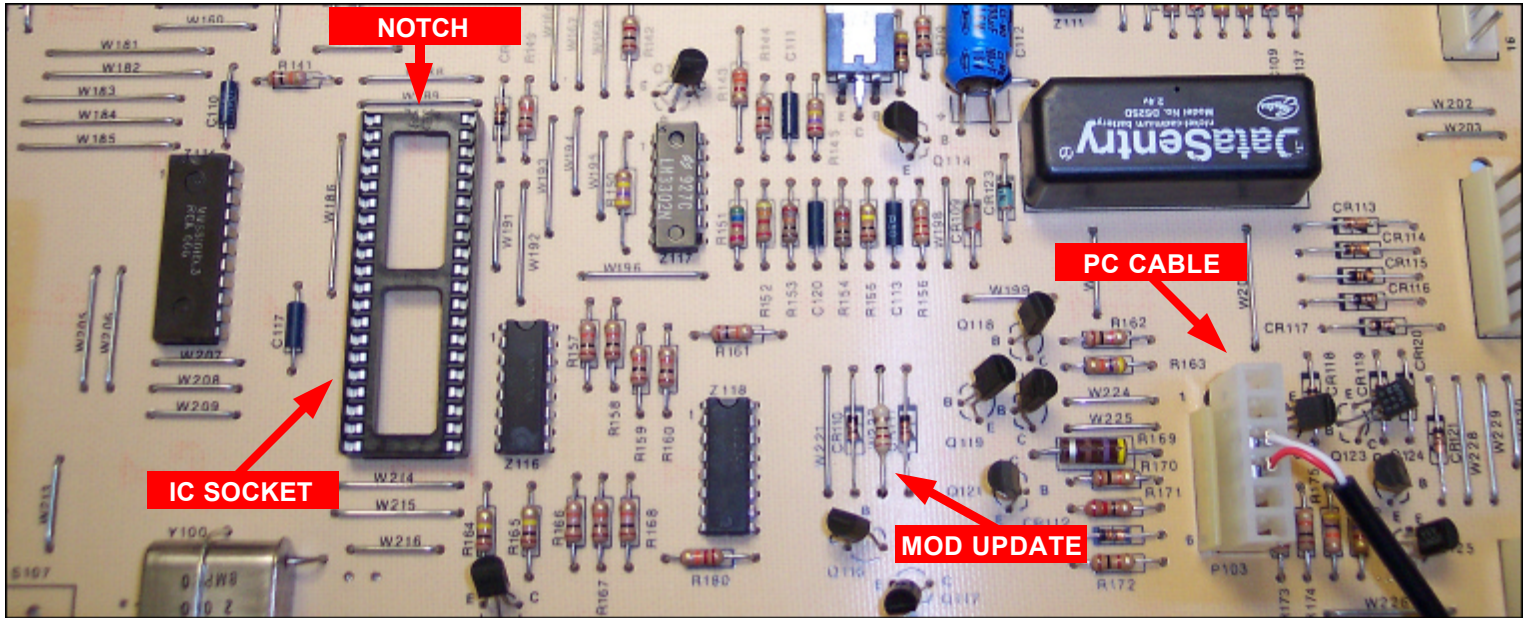
**TEL: (908) 362-6299**

**FAX: (908) 362-5889**

**[www.datasynceng.com](http://www.datasynceng.com)**

**[www.cdadapter.com](http://www.cdadapter.com)**

# PREPARING THE CENTRAL CONTROL COMPUTER CIRCUIT BOARD



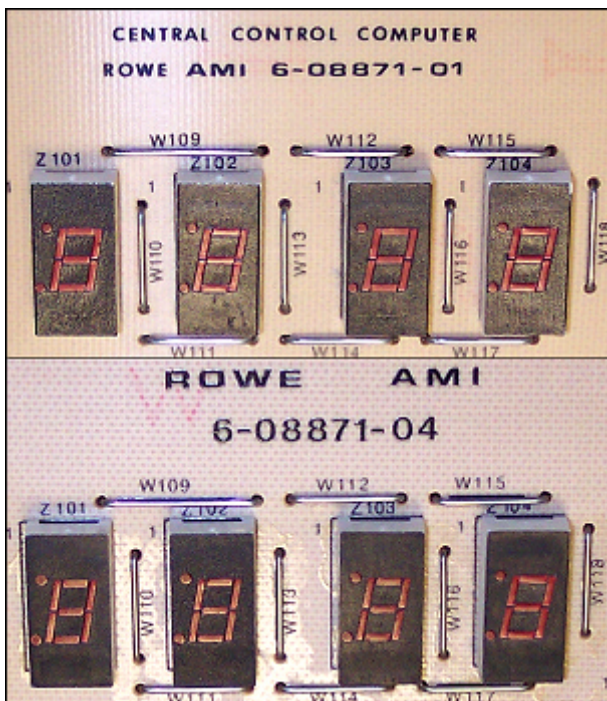
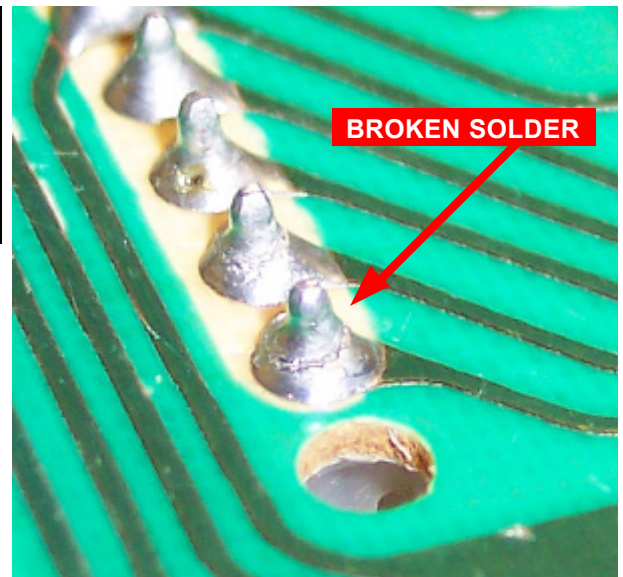
To use the Troubleshooter, you need to remove the custom microprocessor chip and insert a 40-pin IC socket. A low profile, dual leaf type socket, such as 3M part number 4840-6004-CP, is recommended.

The controller chip used in this board is very rare and is no longer available, so you must be very careful when you remove it. Use a low wattage soldering iron and a desoldering tool to remove the solder from the IC pads. Do not heat the pad for too long or it will be damaged and lift off the board. Carefully wiggle each lead with a needle-nose pliers to free it from the pad. Gently pry the IC from the board using a small screwdriver at each end. Do not apply excessive force or you will break a pin.

Insert the 40-pin IC socket with the notch facing up. After soldering the pins, you can remove the residual flux using 91% Isopropyl alcohol.

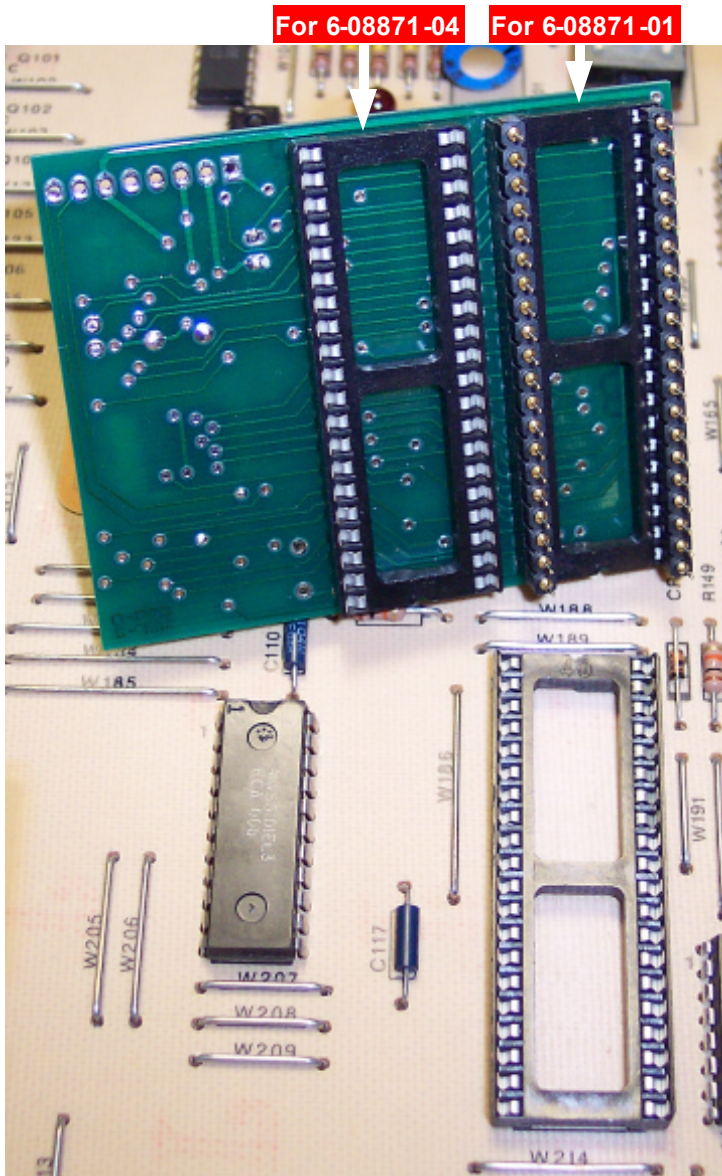
**TIP ...** A Mod Update was issued for CCC board # 6-09971-01, wire jumper W222 was changed to a 220 Ohm 1/4W resistor.

Some board failures are caused by solder joint fractures at the connector pins. This happens when a connector is inserted, which creates pressure on the pin, causing it to push through. The foam padding behind the circuit board was used to relieve this pressure, but in many cases, is either deteriorated or missing altogether. It is best to remove the old solder and resolder these connector pins then clean off the residual flux. You can replace the foam padding with a 1/4" thick rubber mouse pad.

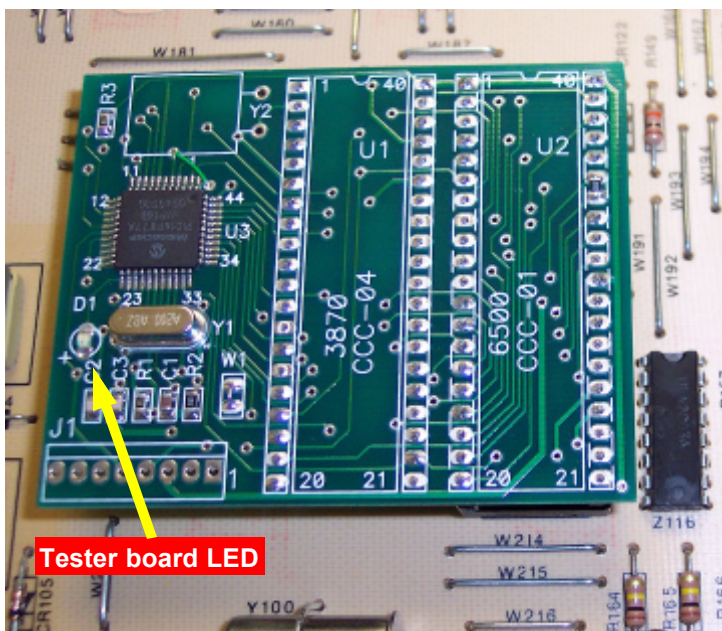


Two circuit board types were produced. The first board was # 6-08871-01 which used the Rockwell 6500 microprocessor IC, the next board was part # 6-08871-04 and used the Mostek 3870 microprocessor. These chips are not interchangeable because of the pinout differences. It is also important to know this when using the Troubleshooter board. You must use the proper position, either the U2 **6500 CCC-01** or U1 **3870 CCC-04**.

## PLUGGING IN TROUBLESHOOTER BOARD



At the bottom side of the tester board are two 40-pin IC sockets. Two 20-pin strip headers will be inserted into one of these sockets. The board under test here is part # 6-08871-01 which uses the U2 socket position. Gently press the pin strip into the socket, being careful not to bend the pins.



Now insert the tester board into the IC socket. Make sure the pins line up with the socket then gently press down.

On the PC Serial cable, plug the 6-pin white connector end into P-103 on the Central Control Computer board.

The 9-pin DSUB connector end plugs into your PC's serial port connector.

If you don't have a serial port, then you need to get a USB to Serial Port adapter cable.



USB to Serial Adapter

## SETTING UP THE MICROSOFT WINDOWS HYPERTERMINAL PROGRAM

On your PC ...

Click **Start** | **All Programs** | **Accessories** | **Communications** | click on **HyperTerminal**

At Connection Name: enter something like **Jukebox**

At Connect Using: select a serial port COM number (usually shows a list of COM#'s available)

Port Settings

Bits per second:	9600
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	None

Click **OK**

Click **File** | **Properties** | **Settings** | **ASCII Setup**

Only boxes checked should be

Append line feeds to incoming line ends

Wrap lines that exceed terminal width

Click **OK** then **OK**

If you wish to capture and save the Troubleshooter activity to a file ...

Click **Transfer** | **Capture Text**

Enter the name of the folder and file you want to save the report to

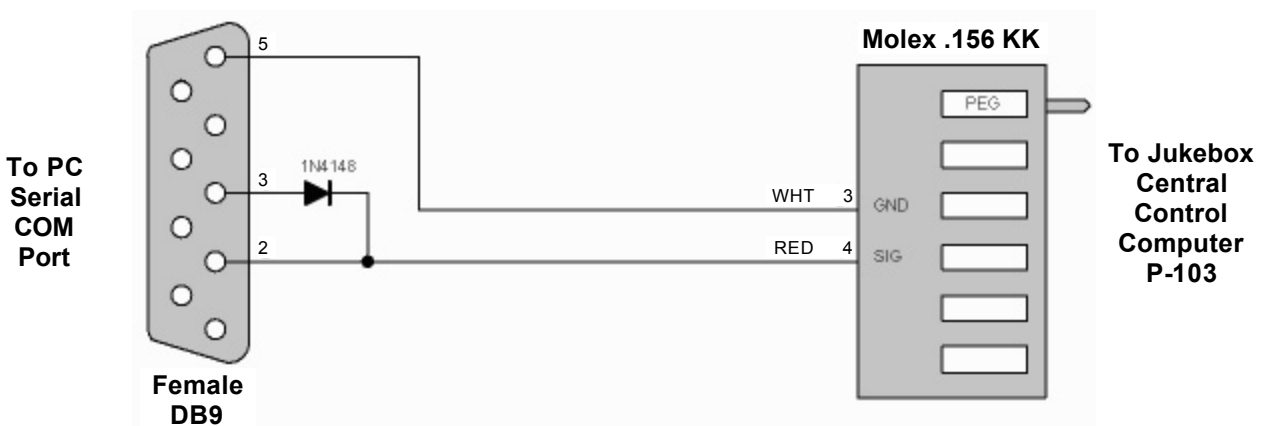
Click **Start**

Select Troubleshooter command functions

When finished

Click **Transfer** | **Capture Text** | **Stop**

## THE PC SERIAL PORT DATA CABLE



## STARTING UP THE TROUBLESHOOTER PROGRAM

When the Central Control Computer board is powered up, the tester board LED should light and start up message displayed.

### If the tester board LED is not on ...

Did you use the correct U1 or U2 position ? Does the socket have 5-volt power ? Is the RESET signal 2-volts or higher ?

```
Rowe R84-R88 Jukebox Troubleshooter
Rev 1.1, 03/07/10 Data Sync Engineering
-----
```

```
CMD>
```

To see a list of all available command functions, type the question mark (?) character:

```
CMD>?
0 - STROBE 0
1 - STROBE 1
2 - STROBE 2
3 - STROBE 3
4 - STROBE 4
5 - STROBE 5
6 - STROBE 6
7 - STROBE 7
8 - STROBE 8
9 - STROBE 9
A - Run All Tests (Memory and Mechanism)
C - Control Computer LED Display Check
D - Dump STROBE/RETURN Data Map
F - Fill RAM Memory
H - Move Mechanism to HOME Position
I - Interrogate STROBE/RETURN Activity
J - Jukebox LED Display Check
M - Record Mechanism Test
P - Print RAM Contents
R - RAM Memory Test
S - Show All Active Signals (as Text)
X - Increment Play Counter
Z - Increment Coin Counter
CMD>
```

### STROBE Commands

The STROBE commands activate 1 of 10 output signals, in a stationary state (high or low), so you would only need a voltmeter to do circuit troubleshooting. The "STROBE OUTPUTS" page shows the voltage readings for each STROBE state. The 1's and 0's display the current logic state of the RETURN input signals. A logic "0" indicates an active or on signal. The "RETURN INPUTS" page shows the RETURN signal map for each of the associated STROBE signals.

For example, if STROBE7 is selected (pressed "7" on the PC keyboard), the following will display:

```
CMD>7
STROBE7:  1 1 1 1 1 1 1 1
```

The STROBE7 output signal is continuously held active and the RETURN signal state displayed. Any change of the RETURN signal state will cause a display update. The following display shows this when a quarter was deposited.

A review of the RETURN signal map (RETURN INPUTS page) shows this signal or bit position to be the "25¢ Coin Switch".

```
STROBE7:  1 1 0 1 1 1 1 1
STROBE7:  1 1 1 1 1 1 1 1
```

0 = switch ON  
1 = switch OFF

## Run All Tests (Memory and Mechanism)

This is a continuously running test that checks RAM memory and Mechanism operations.

For the memory test, the "RAM Retention Data" may fail on the first time because the check pattern has not been written. This check pattern is used to verify the battery backup circuit. After the first time through, turn the power off, wait about 5-minutes, turn the power on then run this test. The "RAM Retention Data" test should pass.

For the mechanism test, the record magazine is rotated then stopped at record number 50. During the rotation, pulse measurements are recorded and displayed for the HOME and INDEX optical signals. When record 50 is reached, it is transferred to the turntable and played. The "A" and "B" side is toggled at each record play cycle. The Pass Number count is displayed after each cycle. Every test step position is displayed.

```
CMD>A
-----
- Starting All Tests ...

- Checking RAM Backup Battery: Good
- Checking RAM Retention Data: Failed
- Running RAM Memory Data Test ...
..... Sequential Pattern
..... Address into Address
- Writing RAM Retention Pattern

-----
Starting Mechanism Test ...

- INNER CAM was not low
- Transfer Motor on
- Waiting for INNER CAM signal low
- Transfer Motor off
- Detent on, magazine unlocked
- Magazine Motor on
- Waiting for HOME signal high
- Waiting for HOME signal low
- Waiting for INDEX signal high
- Waiting for INDEX signal low
..... HOME to Start of INDEX:    20 mS
..... End of INDEX to HOME:      13 mS
..... HOME signal pulse width:   58 mS
..... Index ON pulse width:      25 mS
..... Index OFF pulse width:     33 mS
- HOME and 51 INDEX pulses .....
- Detent off, magazine locked
- Magazine Motor off
- Should be at record position 50
- Turntable motor on
- Transfer Motor on
- Waiting for INNER CAM signal high
- Waiting for OUTER CAM signal low
- Transfer Motor off
- Playing (CANCEL or any key stops)
- Transfer Motor on
- Waiting for INNER CAM signal low
- Transfer Motor off
- Turntable motor off

=====
Pass Number:    1
=====

- Checking RAM Backup Battery: Good
- Checking RAM Retention Data: Passed
- Running RAM Memory Data Test ...
```

## Control Computer LED Display Check

All display digits should be lit on the Central Control Computer board. Check LED segment brightness.

```
CMD>C
- Control Computer LED Display Check
```

## Dump STROBE/RETURN Data Map

Displays all STROBE/RETURN signals. "1" = signal off, "0" = signal active or on.

```
CMD>D

RETURNS      7 6 5 4 3 2 1 0
-----
STROBE0:    1 1 1 1 1 1 1 1
STROBE1:    1 0 1 1 1 1 1 1
STROBE2:    1 1 1 1 1 0 1 0
STROBE3:    1 1 1 1 1 1 1 0
STROBE4:    1 1 1 1 1 1 0 0
STROBE5:    1 1 1 1 1 0 1 0
STROBE6:    1 1 0 1 1 0 0 0
STROBE7:    1 1 1 1 1 1 1 1
STROBE8:    1 1 1 1 1 1 1 1
STROBE9:    1 1 1 1 1 1 1 1
```

## Fill RAM Memory

Writes the specified data pattern to RAM memory (in HEX). See "NUMBERS CONVERSION CHART" page.

```
CMD>F
- Fill RAM Memory, Hex Pattern: 55
```

Hex pattern "55"  
was entered

## Move Mechanism to HOME Position

Moves the record magazine to HOME position which is record number 99.

```
CMD>H
- Moving to HOME Position
```

## Interrogate STROBE/RETURN Activity

This is a powerful diagnostic tool that displays the ON (+) or OFF (-) state of any signal change. Wiggle wire harnesses to find intermittent connections. Test buttons, switches and coin signals. Locate components that fail over time and temperature.

```
CMD>I
-----
Interrogator Started ...

+Keypad "1"
-Keypad "1"
+Keypad "2"
-Keypad "2"
+Keypad "3"
-Keypad "3"
+Cancel Signal
-Cancel Signal
```



## RAM Memory Test

Performs all RAM Memory tests. Stops when a memory error is detected and displays the error result. The LED displays will show random patterns during the memory test. In the example below, pin 11 on Z109 (data in, bit 2) was intentionally lifted off the circuit board to create an error condition. ADDR is memory address being tested, WAS is the data pattern that was read and SB is the data pattern that it should be. Z109 is the upper 4-bits, Z114 is the lower 4-bits.

```
CMD>R
- Checking RAM Backup Battery: Good
- Checking RAM Retention Data: Failed
- Running RAM Memory Data Test ...
ADDR: 0 0 0 0 0 0 0 0   WAS: 0 0 1 1 0 0 0 0   SB: 0 0 0 1 0 0 0 0
- RAM test terminated ...
- Writing RAM Retention Pattern
```

## Show All Active Signals (as Text)

Displays all active or on signals then enters Interrogator Mode. This is used to identify what signals should be or should not be active (such as a stuck push-button switch). It can also be used to verify the pricing board configuration settings. The (CR###) display is the diode designation number associated to that signal.

For example, the configuration for this machine is:

- ~ Order of play is "As Selected"
- ~ Price of Credit Level 1 is 25 cents
- ~ Card level 1 is 1 credit
- ~ Card level 2 is 3 credits
- ~ Card level 3 is 5 credits
- ~ Card level 4 is 7 credits
- ~ Inner Cam switch on = no record in play

```
CMD>S
-----
Interrogator Started ...

+Standard/As Selected switch
+Price of Credit Level 1, 20c (CR326)
+Price of Credit Level 1, 5c (CR324)
+Card Level 1, =1 (CR312)
+Card Level 2, =2 (CR309)
+Card Level 2, =1 (CR308)
+Card Level 3, =4 (CR306)
+Card Level 3, =1 (CR304)
+Inner Cam switch
+Card Level 4, =4 (CR302)
+Card Level 4, =2 (CR301)
+Card Level 4, =1 (CR300)
```

## Increment Play Counter

Causes the mechanical Total Plays counter to increment one position.

```
CMD>X
- Incrementing Play Counter
```

## Increment Coin Counter

Causes the mechanical Money counter to increment one position.

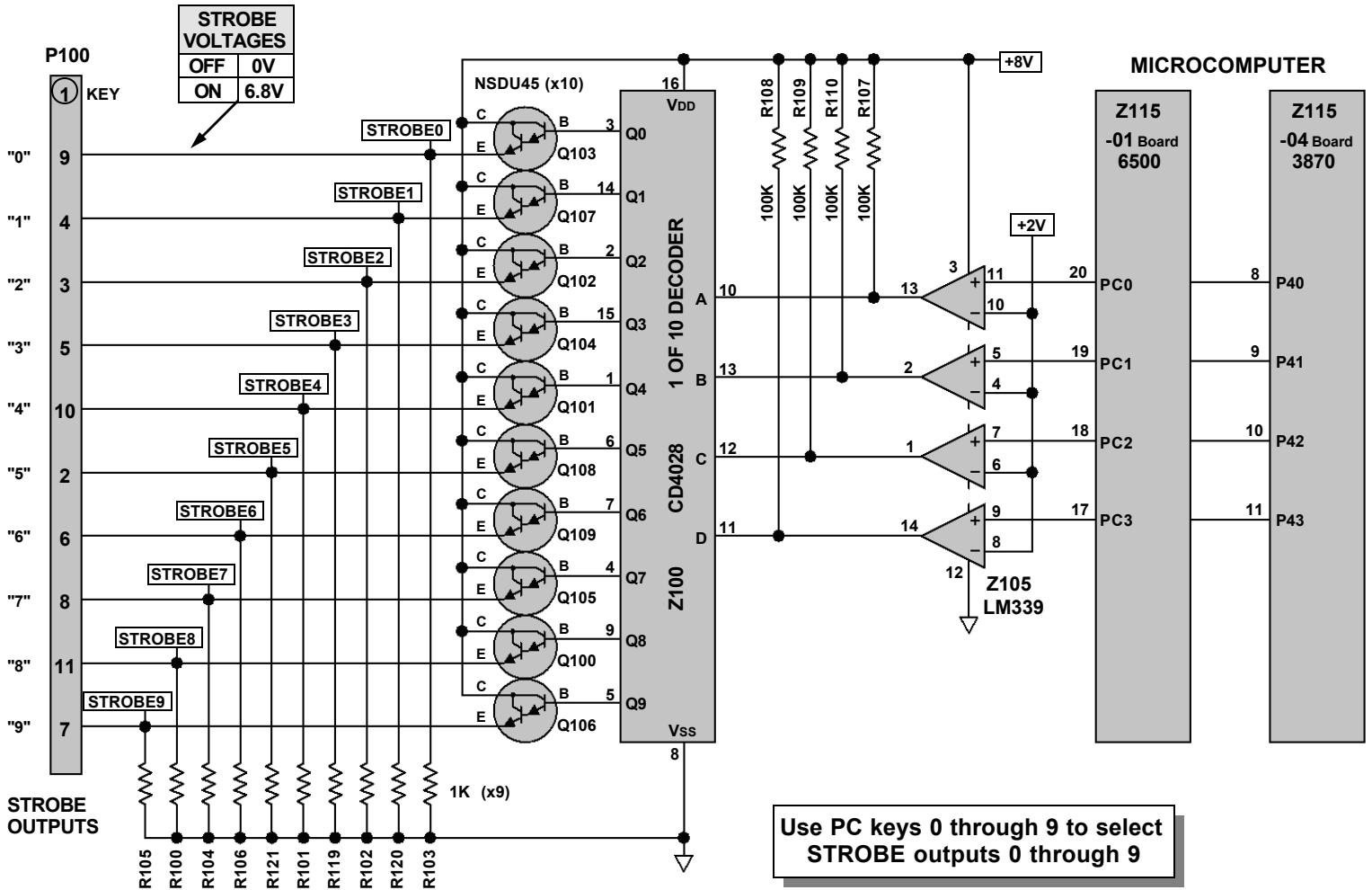
```
CMD>Z
- Incrementing Coin Counter
```

# NUMBERS CONVERSION CHART

## HEX / BINARY / DECIMAL

<b>00</b> 0000 0000 0	<b>01</b> 0000 0001 1	<b>02</b> 0000 0010 2	<b>03</b> 0000 0011 3	<b>04</b> 0000 0100 4	<b>05</b> 0000 0101 5	<b>06</b> 0000 0110 6	<b>07</b> 0000 0111 7	<b>08</b> 0000 1000 8	<b>09</b> 0000 1001 9	<b>0A</b> 0000 1010 10	<b>0B</b> 0000 1011 11	<b>0C</b> 0000 1100 12	<b>0D</b> 0000 1101 13	<b>0E</b> 0000 1110 14	<b>0F</b> 0000 1111 15
<b>10</b> 0001 0000 16	<b>11</b> 0001 0001 17	<b>12</b> 0001 0010 18	<b>13</b> 0001 0011 19	<b>14</b> 0001 0100 20	<b>15</b> 0001 0101 21	<b>16</b> 0001 0110 22	<b>17</b> 0001 0111 23	<b>18</b> 0001 1000 24	<b>19</b> 0001 1001 25	<b>1A</b> 0001 1010 26	<b>1B</b> 0001 1011 27	<b>1C</b> 0001 1100 28	<b>1D</b> 0001 1101 29	<b>1E</b> 0001 1110 30	<b>1F</b> 0001 1111 31
<b>20</b> 0010 0000 32	<b>21</b> 0010 0001 33	<b>22</b> 0010 0010 34	<b>23</b> 0010 0011 35	<b>24</b> 0010 0100 36	<b>25</b> 0010 0101 37	<b>26</b> 0010 0110 38	<b>27</b> 0010 0111 39	<b>28</b> 0010 1000 40	<b>29</b> 0010 1001 41	<b>2A</b> 0010 1010 42	<b>2B</b> 0010 1011 43	<b>2C</b> 0010 1100 44	<b>2D</b> 0010 1101 45	<b>2E</b> 0010 1110 46	<b>2F</b> 0010 1111 47
<b>30</b> 0011 0000 48	<b>31</b> 0011 0001 49	<b>32</b> 0011 0010 50	<b>33</b> 0011 0011 51	<b>34</b> 0011 0100 52	<b>35</b> 0011 0101 53	<b>36</b> 0011 0110 54	<b>37</b> 0011 0111 55	<b>38</b> 0011 1000 56	<b>39</b> 0011 1001 57	<b>3A</b> 0011 1010 58	<b>3B</b> 0011 1011 59	<b>3C</b> 0011 1100 60	<b>3D</b> 0011 1101 61	<b>3E</b> 0011 1110 62	<b>3F</b> 0011 1111 63
<b>40</b> 0100 0000 64	<b>41</b> 0100 0001 65	<b>42</b> 0100 0010 66	<b>43</b> 0100 0011 67	<b>44</b> 0100 0100 68	<b>45</b> 0100 0101 69	<b>46</b> 0100 0110 70	<b>47</b> 0100 0111 71	<b>48</b> 0100 1000 72	<b>49</b> 0100 1001 73	<b>4A</b> 0100 1010 74	<b>4B</b> 0100 1011 75	<b>4C</b> 0100 1100 76	<b>4D</b> 0100 1101 77	<b>4E</b> 0100 1110 78	<b>4F</b> 0100 1111 79
<b>50</b> 0101 0000 80	<b>51</b> 0101 0001 81	<b>52</b> 0101 0010 82	<b>53</b> 0101 0011 83	<b>54</b> 0101 0100 84	<b>55</b> 0101 0101 85	<b>56</b> 0101 0110 86	<b>57</b> 0101 0111 87	<b>58</b> 0101 1000 88	<b>59</b> 0101 1001 89	<b>5A</b> 0101 1010 90	<b>5B</b> 0101 1011 91	<b>5C</b> 0101 1100 92	<b>5D</b> 0101 1101 93	<b>5E</b> 0101 1110 94	<b>5F</b> 0101 1111 95
<b>60</b> 0110 0000 96	<b>61</b> 0110 0001 97	<b>62</b> 0110 0010 98	<b>63</b> 0110 0011 99	<b>64</b> 0110 0100 100	<b>65</b> 0110 0101 101	<b>66</b> 0110 0110 102	<b>67</b> 0110 0111 103	<b>68</b> 0110 1000 104	<b>69</b> 0110 1001 105	<b>6A</b> 0110 1010 106	<b>6B</b> 0110 1011 107	<b>6C</b> 0110 1100 108	<b>6D</b> 0110 1101 109	<b>6E</b> 0110 1110 110	<b>6F</b> 0110 1111 111
<b>70</b> 0111 0000 112	<b>71</b> 0111 0001 113	<b>72</b> 0111 0010 114	<b>73</b> 0111 0011 115	<b>74</b> 0111 0100 116	<b>75</b> 0111 0101 117	<b>76</b> 0111 0110 118	<b>77</b> 0111 0111 119	<b>78</b> 0111 1000 120	<b>79</b> 0111 1001 121	<b>7A</b> 0111 1010 122	<b>7B</b> 0111 1011 123	<b>7C</b> 0111 1100 124	<b>7D</b> 0111 1101 125	<b>7E</b> 0111 1110 126	<b>7F</b> 0111 1111 127
<b>80</b> 1000 0000 128	<b>81</b> 1000 0001 129	<b>82</b> 1000 0010 130	<b>83</b> 1000 0011 131	<b>84</b> 1000 0100 132	<b>85</b> 1000 0101 133	<b>86</b> 1000 0110 134	<b>87</b> 1000 0111 135	<b>88</b> 1000 1000 136	<b>89</b> 1000 1001 137	<b>8A</b> 1000 1010 138	<b>8B</b> 1000 1011 139	<b>8C</b> 1000 1100 140	<b>8D</b> 1000 1101 141	<b>8E</b> 1000 1110 142	<b>8F</b> 1000 1111 143
<b>90</b> 1001 0000 144	<b>91</b> 1001 0001 145	<b>92</b> 1001 0010 146	<b>93</b> 1001 0011 147	<b>94</b> 1001 0100 148	<b>95</b> 1001 0101 149	<b>96</b> 1001 0110 150	<b>97</b> 1001 0111 151	<b>98</b> 1001 1000 152	<b>99</b> 1001 1001 153	<b>9A</b> 1001 1010 154	<b>9B</b> 1001 1011 155	<b>9C</b> 1001 1100 156	<b>9D</b> 1001 1101 157	<b>9E</b> 1001 1110 158	<b>9F</b> 1001 1111 159
<b>A0</b> 1010 0000 160	<b>A1</b> 1010 0001 161	<b>A2</b> 1010 0010 162	<b>A3</b> 1010 0011 163	<b>A4</b> 1010 0100 164	<b>A5</b> 1010 0101 165	<b>A6</b> 1010 0110 166	<b>A7</b> 1010 0111 167	<b>A8</b> 1010 1000 168	<b>A9</b> 1010 1001 169	<b>AA</b> 1010 1010 170	<b>AB</b> 1010 1011 171	<b>AC</b> 1010 1100 172	<b>AD</b> 1010 1101 173	<b>AE</b> 1010 1110 174	<b>AF</b> 1010 1111 175
<b>B0</b> 1011 0000 176	<b>B1</b> 1011 0001 177	<b>B2</b> 1011 0010 178	<b>B3</b> 1011 0011 179	<b>B4</b> 1011 0100 180	<b>B5</b> 1011 0101 181	<b>B6</b> 1011 0110 182	<b>B7</b> 1011 0111 183	<b>B8</b> 1011 1000 184	<b>B9</b> 1011 1001 185	<b>BA</b> 1011 1010 186	<b>BB</b> 1011 1011 187	<b>BC</b> 1011 1100 188	<b>BD</b> 1011 1101 189	<b>BE</b> 1011 1110 190	<b>BF</b> 1011 1111 191
<b>C0</b> 1100 0000 192	<b>C1</b> 1100 0001 193	<b>C2</b> 1100 0010 194	<b>C3</b> 1100 0011 195	<b>C4</b> 1100 0100 196	<b>C5</b> 1100 0101 197	<b>C6</b> 1100 0110 198	<b>C7</b> 1100 0111 199	<b>C8</b> 1100 1000 200	<b>C9</b> 1100 1001 201	<b>CA</b> 1100 1010 202	<b>CB</b> 1100 1011 203	<b>CC</b> 1100 1100 204	<b>CD</b> 1100 1101 205	<b>CE</b> 1100 1110 206	<b>CF</b> 1100 1111 207
<b>D0</b> 1101 0000 208	<b>D1</b> 1101 0001 209	<b>D2</b> 1101 0010 210	<b>D3</b> 1101 0011 211	<b>D4</b> 1101 0100 212	<b>D5</b> 1101 0101 213	<b>D6</b> 1101 0110 214	<b>D7</b> 1101 0111 215	<b>D8</b> 1101 1000 216	<b>D9</b> 1101 1001 217	<b>DA</b> 1101 1010 218	<b>DB</b> 1101 1011 219	<b>DC</b> 1101 1100 220	<b>DD</b> 1101 1101 221	<b>DE</b> 1101 1110 222	<b>DF</b> 1101 1111 223
<b>E0</b> 1110 0000 224	<b>E1</b> 1110 0001 225	<b>E2</b> 1110 0010 226	<b>E3</b> 1110 0011 227	<b>E4</b> 1110 0100 228	<b>E5</b> 1110 0101 229	<b>E6</b> 1110 0110 230	<b>E7</b> 1110 0111 231	<b>E8</b> 1110 1000 232	<b>E9</b> 1110 1001 233	<b>EA</b> 1110 1010 234	<b>EB</b> 1110 1011 235	<b>EC</b> 1110 1100 236	<b>ED</b> 1110 1101 237	<b>EE</b> 1110 1110 238	<b>EF</b> 1110 1111 239
<b>F0</b> 1111 0000 240	<b>F1</b> 1111 0001 241	<b>F2</b> 1111 0010 242	<b>F3</b> 1111 0011 243	<b>F4</b> 1111 0100 244	<b>F5</b> 1111 0101 245	<b>F6</b> 1111 0110 246	<b>F7</b> 1111 0111 247	<b>F8</b> 1111 1000 248	<b>F9</b> 1111 1001 249	<b>FA</b> 1111 1010 250	<b>FB</b> 1111 1011 251	<b>FC</b> 1111 1100 252	<b>FD</b> 1111 1101 253	<b>FE</b> 1111 1110 254	<b>FF</b> 1111 1111 255

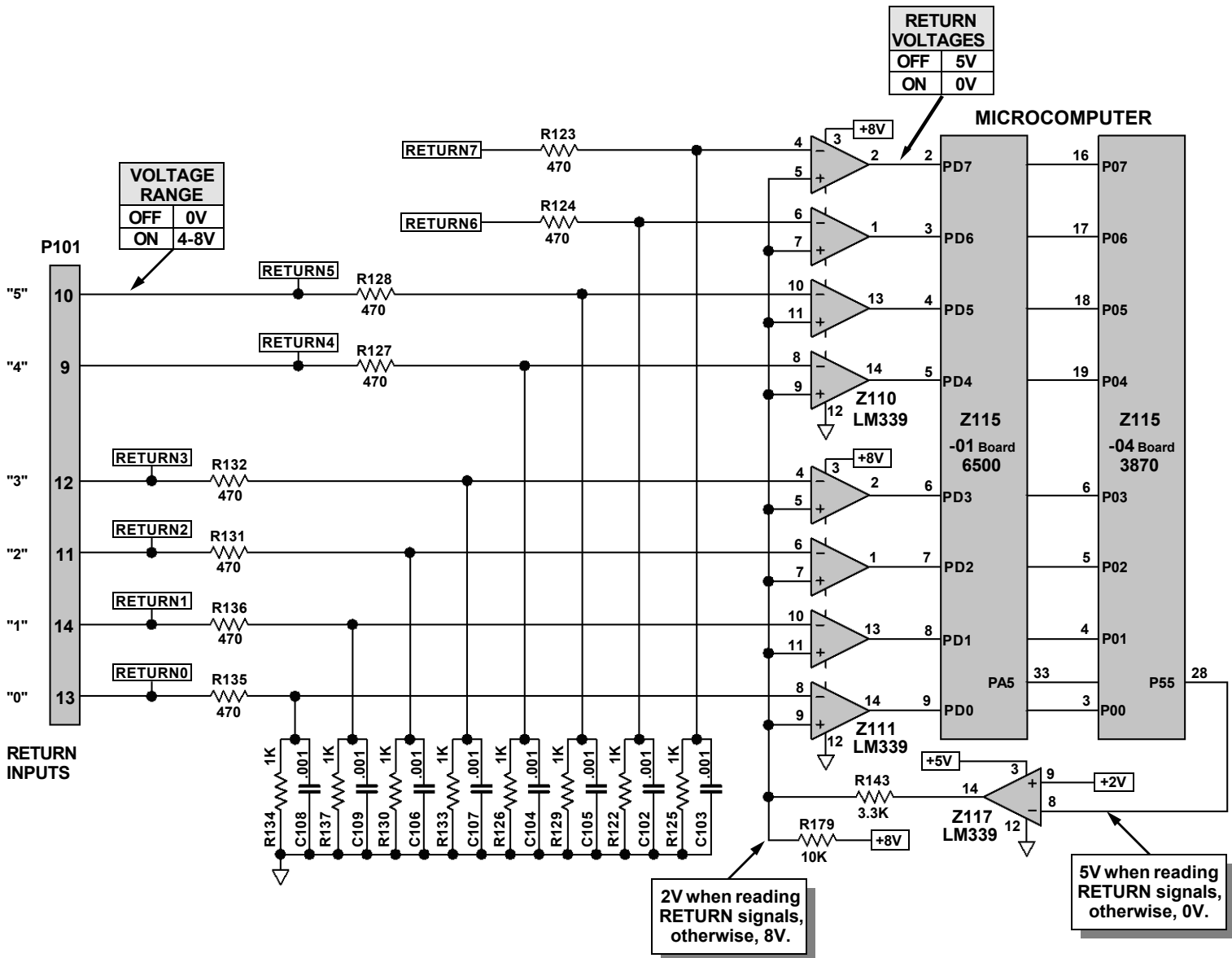
# STROBE OUTPUTS



## VOLTMETER MEASUREMENTS

	STROBE0 P100-9 CMD "0"	STROBE1 P100-4 CMD "1"	STROBE2 P100-3 CMD "2"	STROBE3 P100-5 CMD "3"	STROBE4 P100-10 CMD "4"	STROBE5 P100-2 CMD "5"	STROBE6 P100-6 CMD "6"	STROBE7 P100-8 CMD "7"	STROBE8 P100-11 CMD "8"	STROBE9 P100-7 CMD "9"
Z105-5	0V	0V	+5V	+5V	0V	0V	+5V	+5V	0V	0V
Z105-7	0V	0V	0V	0V	+5V	+5V	+5V	+5V	0V	0V
Z105-9	0V	0V	0V	0V	0V	0V	0V	0V	+5V	+5V
Z105-11	0V	+5V	0V	+5V	0V	+5V	0V	+5V	0V	+5V
Z100-1	0V	0V	0V	0V	+8V	0V	0V	0V	0V	0V
Z100-2	0V	0V	+8V	0V	0V	0V	0V	0V	0V	0V
Z100-3	+8V	0V	0V	0V	0V	0V	0V	0V	0V	0V
Z100-4	0V	0V	0V	0V	0V	0V	0V	+8V	0V	0V
Z100-5	0V	0V	0V	0V	0V	0V	0V	0V	0V	+8V
Z100-6	0V	0V	0V	0V	0V	+8V	0V	0V	0V	0V
Z100-7	0V	0V	0V	0V	0V	0V	+8V	0V	0V	0V
Z100-9	0V	0V	0V	0V	0V	0V	0V	0V	+8V	0V
Z100-10	0V	+8V	0V	+8V	0V	+8V	0V	+8V	0V	+8V
Z100-11	0V	0V	0V	0V	0V	0V	0V	0V	+8V	+8V
Z100-12	0V	0V	0V	0V	+8V	+8V	+8V	+8V	0V	0V
Z100-13	0V	0V	+8V	+8V	0V	0V	+8V	+8V	0V	0V
Z100-14	0V	+8V	0V	0V	0V	0V	0V	0V	0V	0V
Z100-15	0V	0V	0V	+8V	0V	0V	0V	0V	0V	0V

# RETURN INPUTS

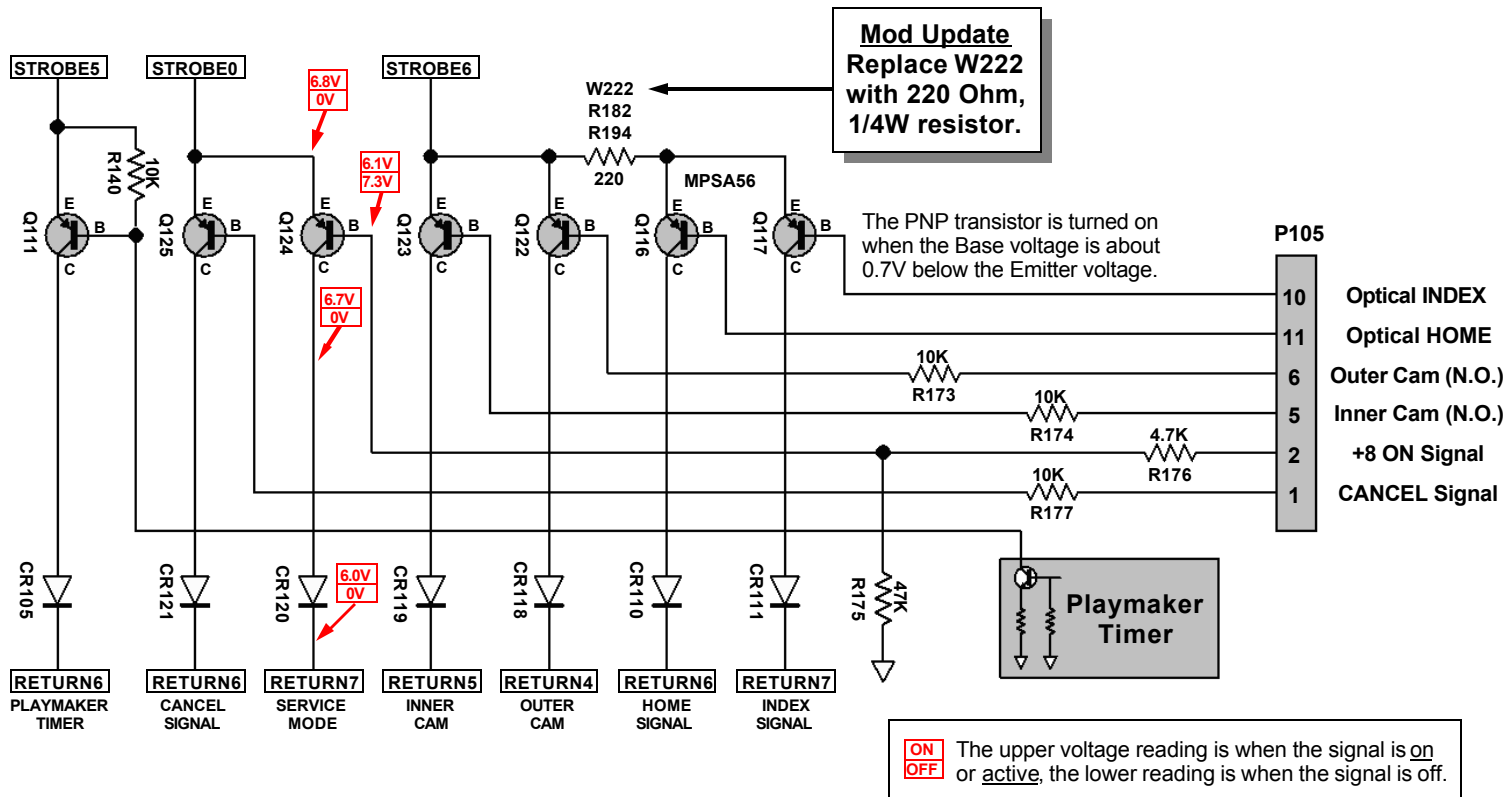


"STROBE output" to "RETURN input" signal matrix

Shaded area are the RETURN signals from the P101 Connector

	RETURN 7	RETURN 6	RETURN 5	RETURN 4	RETURN 3	RETURN 2	RETURN 1	RETURN 0
<b>STROBE 0</b>	+8 On (service switch)	Cancel Signal		Dollar Bill Bonus <b>1</b>	Prem Ratio <b>8</b>	Prem Ratio <b>4</b>	Prem Ratio <b>2</b>	Prem Ratio <b>1</b>
<b>STROBE 1</b>	Test Switch	STD / As Selected		Dollar Bill Bonus <b>2</b>	1 Play Price <b>8</b>	1 Play Price <b>4</b>	1 Play Price <b>2</b>	1 Play Price <b>1</b>
<b>STROBE 2</b>	Clear Selection Memory	Manual Credit		Coin Ratio	Price of Crd Lvl 1 <b>40¢</b>	Price of Crd Lvl 1 <b>20¢</b>	Price of Crd Lvl 1 <b>10¢</b>	Price of Crd Lvl 1 <b>5¢</b>
<b>STROBE 3</b>		Most / Least Popular		<b>1, 2, 4, 8</b>	Card Level 1 <b>8</b>	Card Level 1 <b>4</b>	Card Level 1 <b>2</b>	Card Level 1 <b>1</b>
<b>STROBE 4</b>	Memorec Reset	Memorec Advance	<b>1, 2, 3, 5</b>	<b>1, 2, 5, 10</b>	Card Level 2 <b>8</b>	Card Level 2 <b>4</b>	Card Level 2 <b>2</b>	Card Level 2 <b>1</b>
<b>STROBE 5</b>		Playmaker Timer		16 Play Adder	Card Level 3 <b>8</b>	Card Level 3 <b>4</b>	Card Level 3 <b>2</b>	Card Level 3 <b>1</b>
<b>STROBE 6</b>	Optical Index	Optical Home	Inner Cam Switch	Outer Cam Switch	Card Level 4 <b>8</b>	Card Level 4 <b>4</b>	Card Level 4 <b>2</b>	Card Level 4 <b>1</b>
<b>STROBE 7</b>	\$1 Bill Switch	50¢ Coin Switch	25¢ Coin Switch	10¢ Coin Switch	5¢ Coin Switch	160 Play	<b>POPULAR</b>	<b>RESET</b>
<b>STROBE 8</b>			RI-3	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>STROBE 9</b>			Premium Price Key	<b>0</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>6</b>

## TRANSISTOR SWITCHES



### "STROBE output" to "RETURN input" signal matrix

Shaded area are the RETURN signals from the P101 Connector

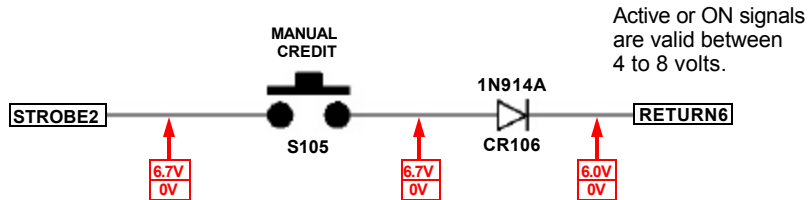
	RETURN 7	RETURN 6	RETURN 5	RETURN 4	RETURN 3	RETURN 2	RETURN 1	RETURN 0
<b>STROBE 0</b>	+8 On (service switch)	Cancel Signal		Dollar Bill Bonus 1	Prem Ratio 8	Prem Ratio 4	Prem Ratio 2	Prem Ratio 1
<b>STROBE 1</b>	Test Switch	STD / As Selected		Dollar Bill Bonus 2	1 Play Price 8	1 Play Price 4	1 Play Price 2	1 Play Price 1
<b>STROBE 2</b>	Clear Selection Memory	Manual Credit		Coin Ratio	Price of Crd Lvl 1 40¢	Price of Crd Lvl 1 20¢	Price of Crd Lvl 1 10¢	Price of Crd Lvl 1 5¢
<b>STROBE 3</b>		Most / Least Popular		1, 2, 4, 8	Card Level 1 8	Card Level 1 4	Card Level 1 2	Card Level 1 1
<b>STROBE 4</b>	Memorec Reset	Memorec Advance	1, 2, 3, 5	1, 2, 5, 10	Card Level 2 8	Card Level 2 4	Card Level 2 2	Card Level 2 1
<b>STROBE 5</b>		Playmaker Timer		16 Play Adder	Card Level 3 8	Card Level 3 4	Card Level 3 2	Card Level 3 1
<b>STROBE 6</b>	Optical Index	Optical Home	Inner Cam Switch	Outer Cam Switch	Card Level 4 8	Card Level 4 4	Card Level 4 2	Card Level 4 1
<b>STROBE 7</b>	\$1 Bill Switch	50¢ Coin Switch	25¢ Coin Switch	10¢ Coin Switch	5¢ Coin Switch	160 Play	<b>POPULAR</b>	<b>RESET</b>
<b>STROBE 8</b>			RI-3	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>STROBE 9</b>			Premium Price Key	<b>0</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>6</b>

## MECHANICAL SWITCHES, PROGRAM DIODES & CARDS

All other switches, including coin and keypad, use the same circuitry, a switch, the appropriate STROBE / RETURN signals and a diode.

Programming cards and diodes use a fixed circuit trace instead of a switch.

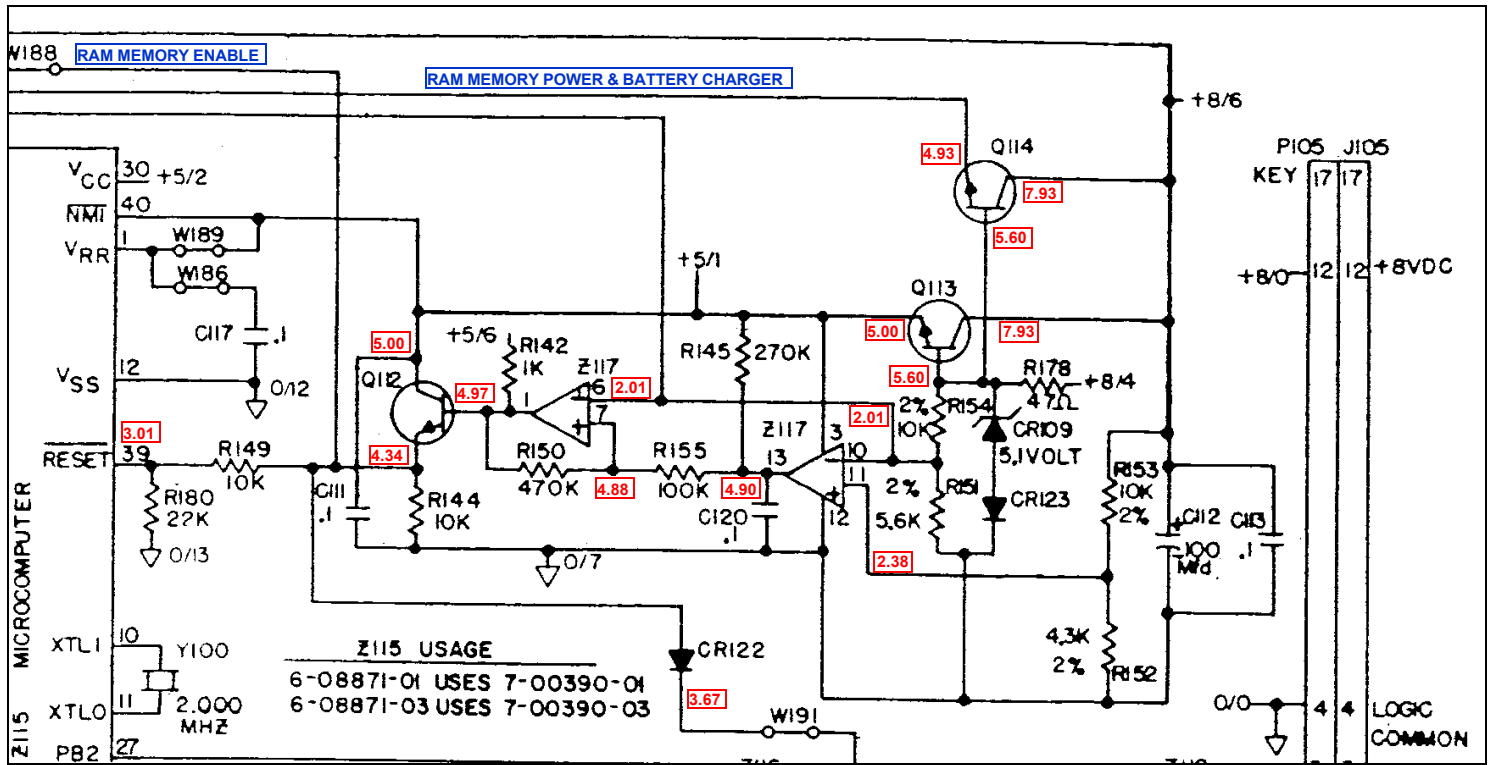
The matrix above shows the STROBE / RETURN correlation of all signals.



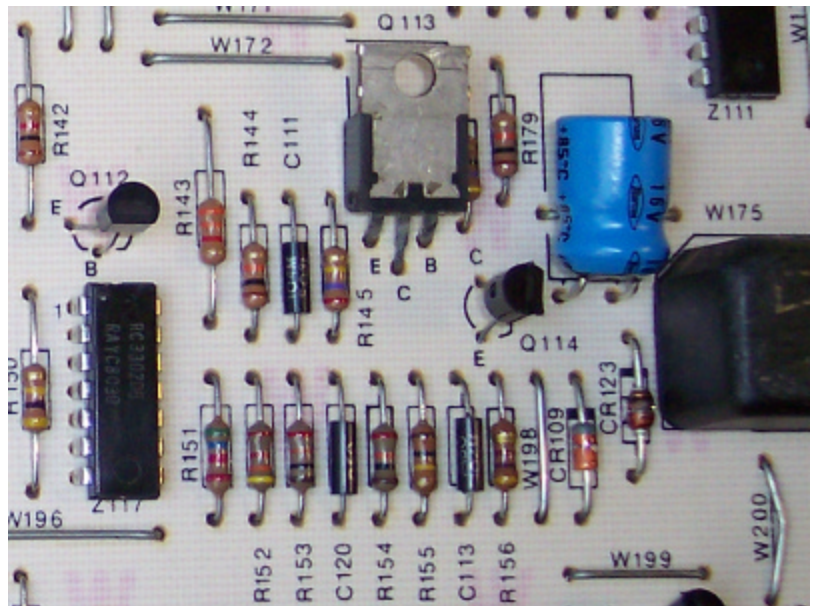


# VOLTAGE MONITOR / POWER SUPPLY REGULATOR FOR -01 BOARD

## ROCKWELL -01 BOARD

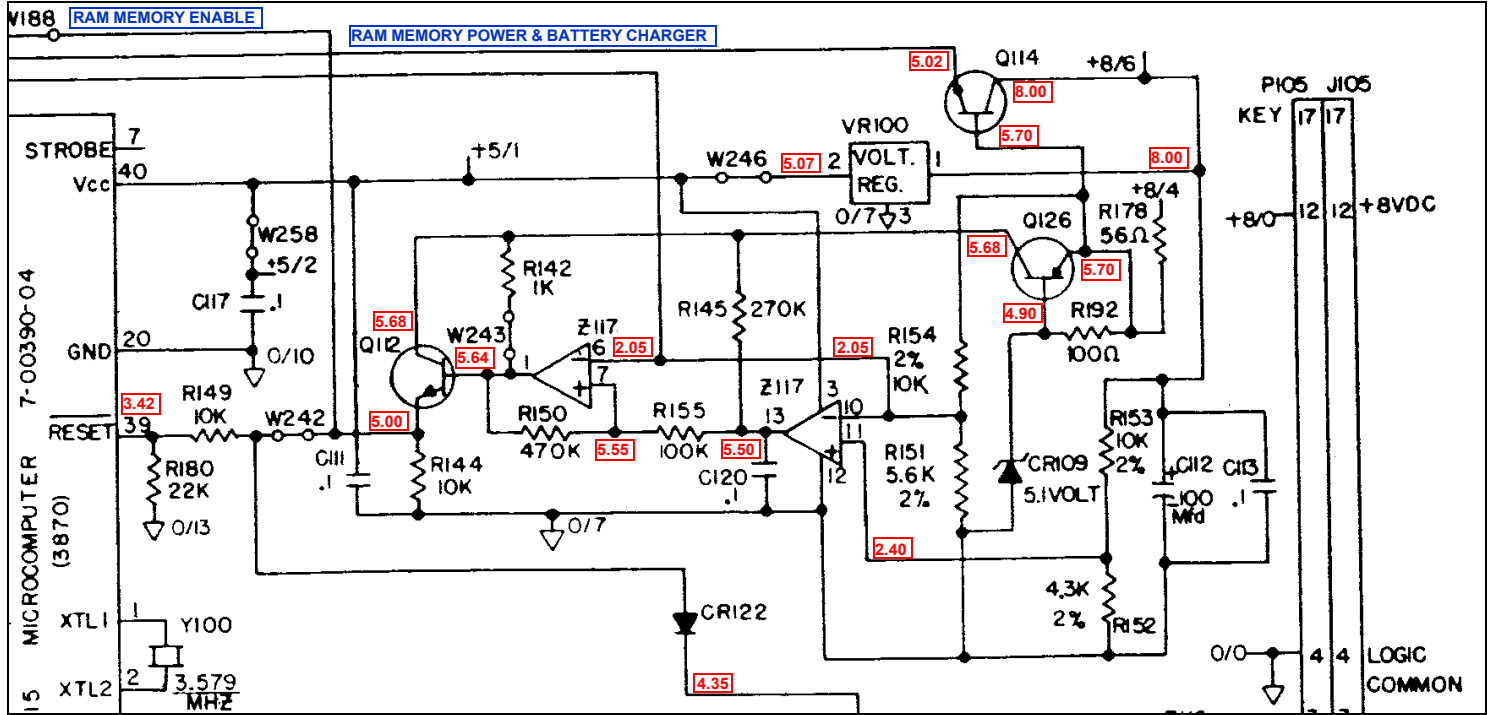


CR109	DIODE, Zener, 1N4733A, 5.1V, 1W
CR122	DIODE, Signal, 1N914
CR123	DIODE, Rectifier, 1N4002, 100V, 1A
Q112	TRANSISTOR, NPN, MPS-A06, 500mA, 80V
Q113	TRANSISTOR, NPN, TIP31A, 60V, 3A
Q114	TRANSISTOR, NPN, MPS-A06, 500mA, 80V
Z115	IC, R6500, (CUSTOM MICROCONTROLLER)
Z117	IC, LM3302 / LM339, Quad Voltage Comparator

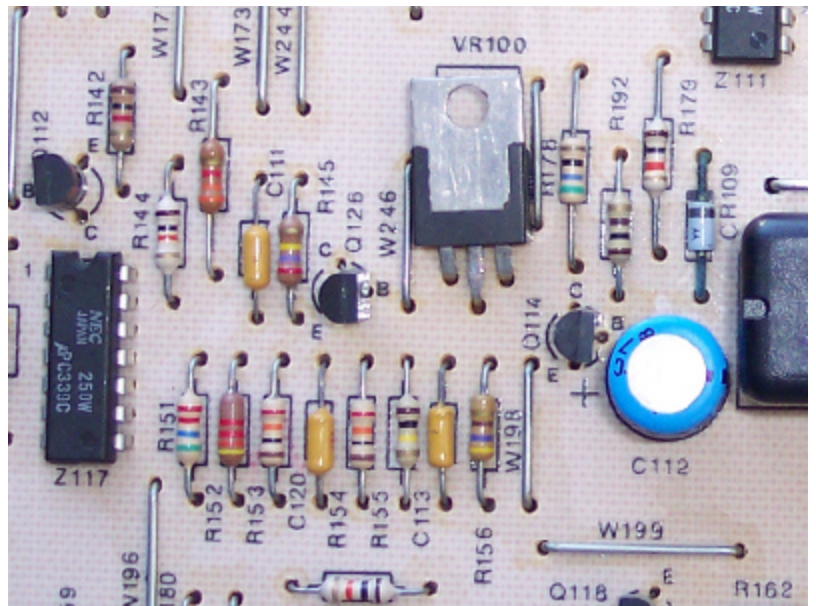


# VOLTAGE MONITOR / POWER SUPPLY REGULATOR FOR -04 BOARD

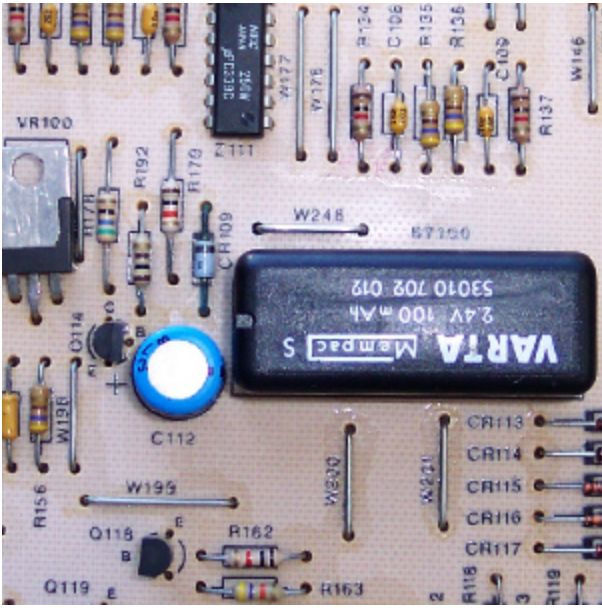
## MOSTEK -04 BOARD



CR109	DIODE, Zener, 1N4733A, 5.1V, 1W
CR122	DIODE, Signal, 1N914
Q112	TRANSISTOR, NPN, MPS-A06, 500mA, 80V
Q114	TRANSISTOR, NPN, MPS-A06, 500mA, 80V
Q126	TRANSISTOR, PNP, MPS-A56, 500mA, 80V
VR100	IC, LM340T-5 / LM7805, +5V Regulator, 1A
Z115	IC, MK3870, (CUSTOM MICROCONTROLLER)
Z117	IC, LM3302 / LM339, Quad Voltage Comparator



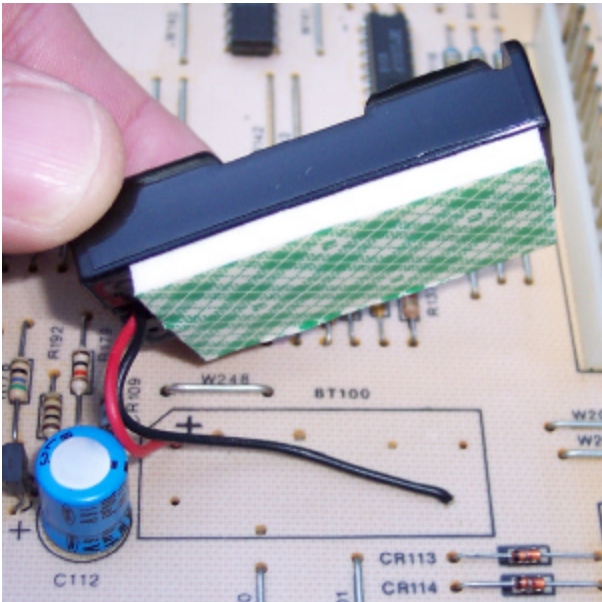
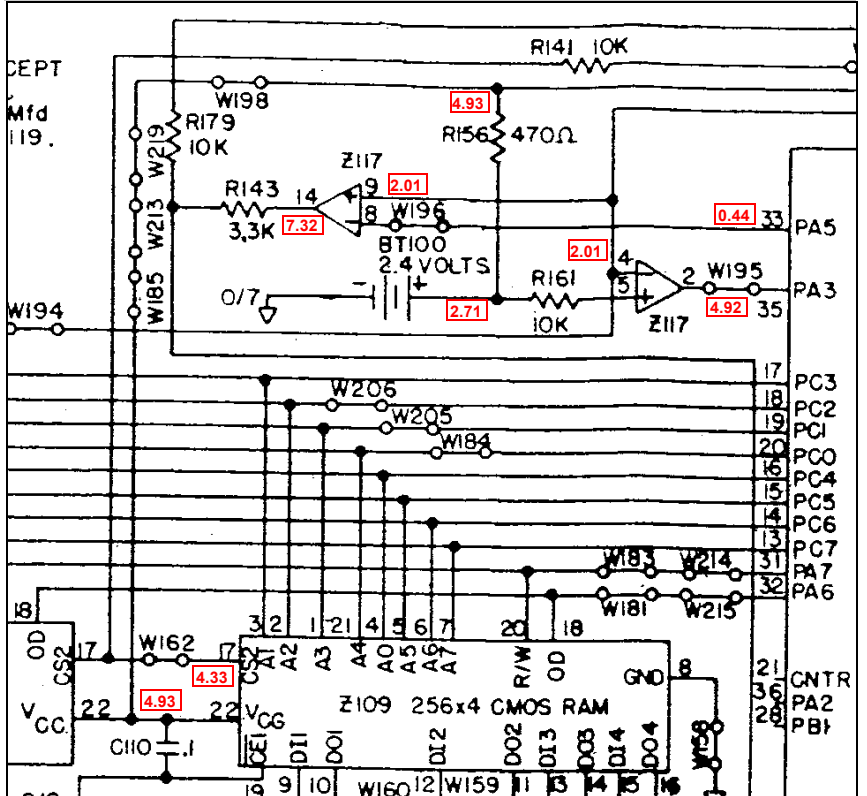
# MEMORY BACK-UP BATTERY / BATTERY VOLTAGE DETECTOR



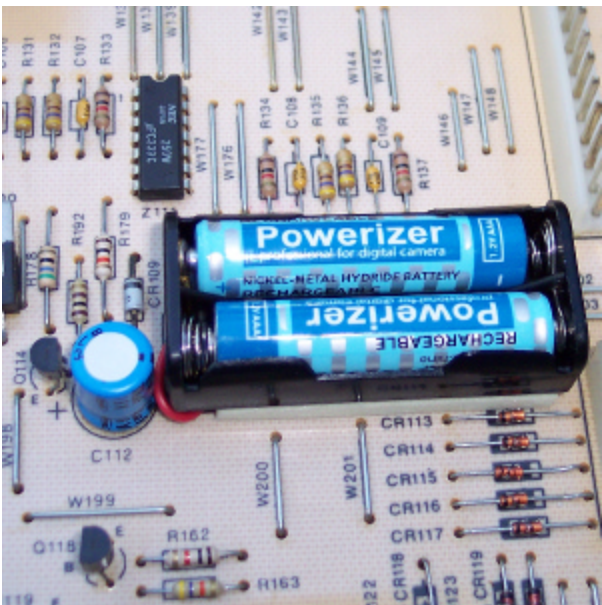
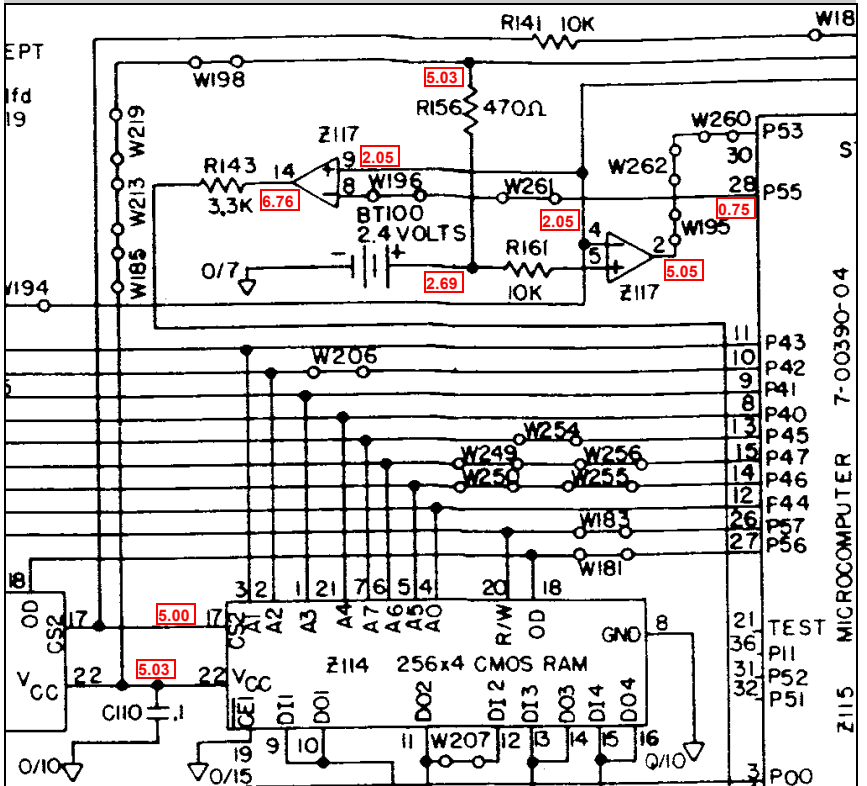
The original back-up battery is most likely "very old" and will cause acid damage if leaking (green corrosion). You can replace it with a dual AAA battery holder (Mouser 122-0421-GR), double-side foam tape and new rechargeable Nickel-Metal Hydride AAA batteries.

**TIP ...** Use a cotton swap with household ammonia to remove the green corrosion, afterwards, rinse and blow dry.

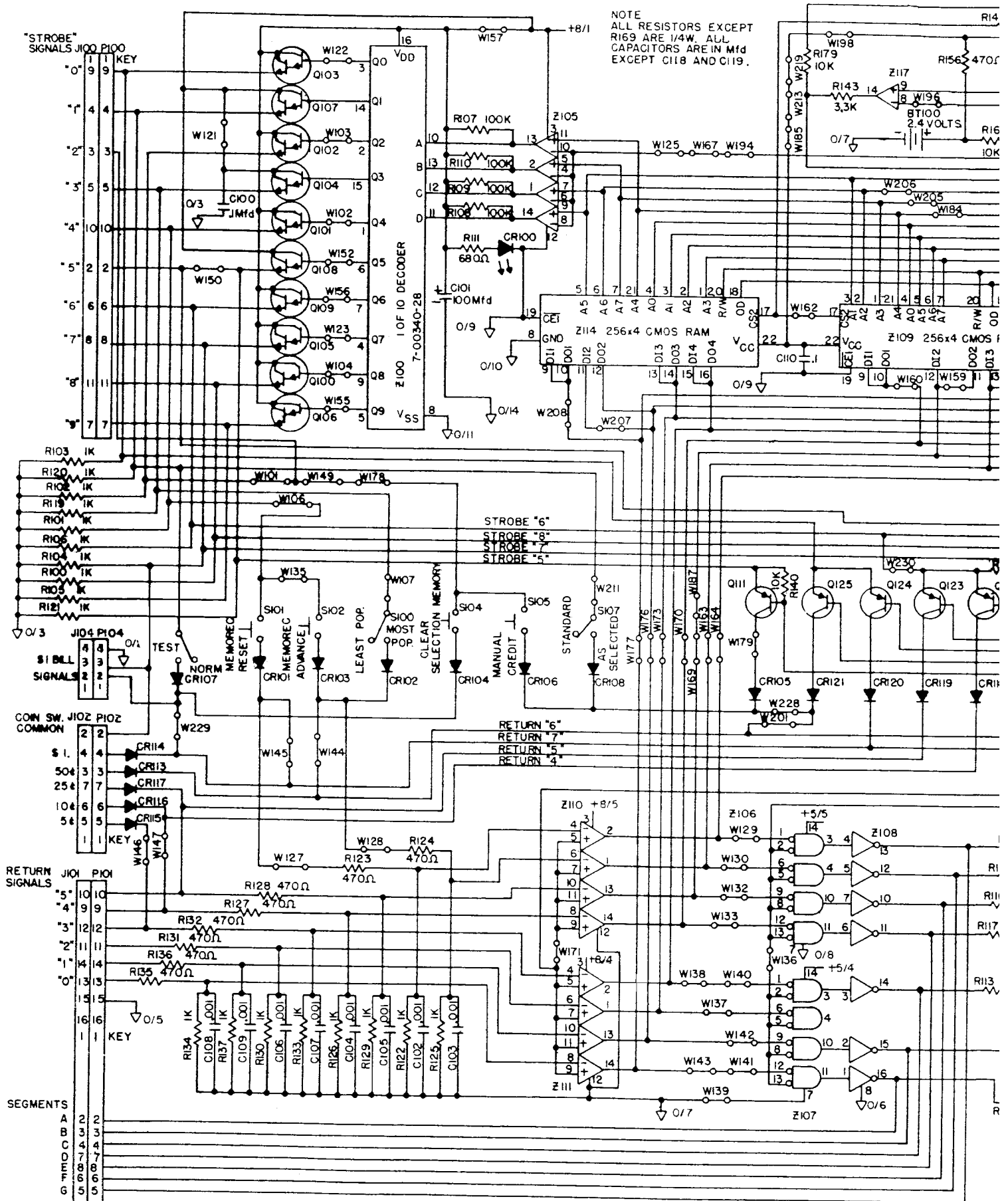
## Rockwell -01 Board



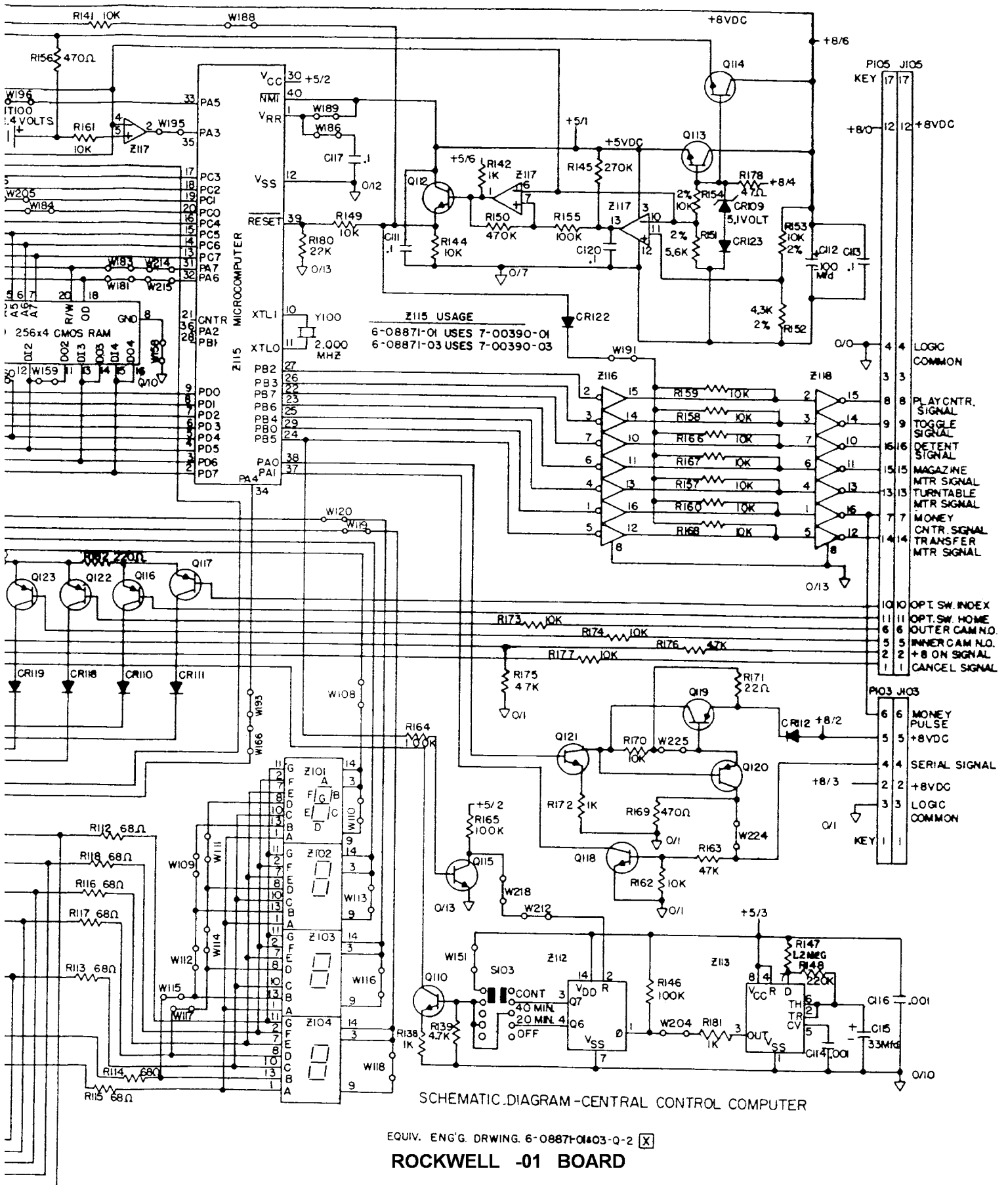
## Mostek -04 Board



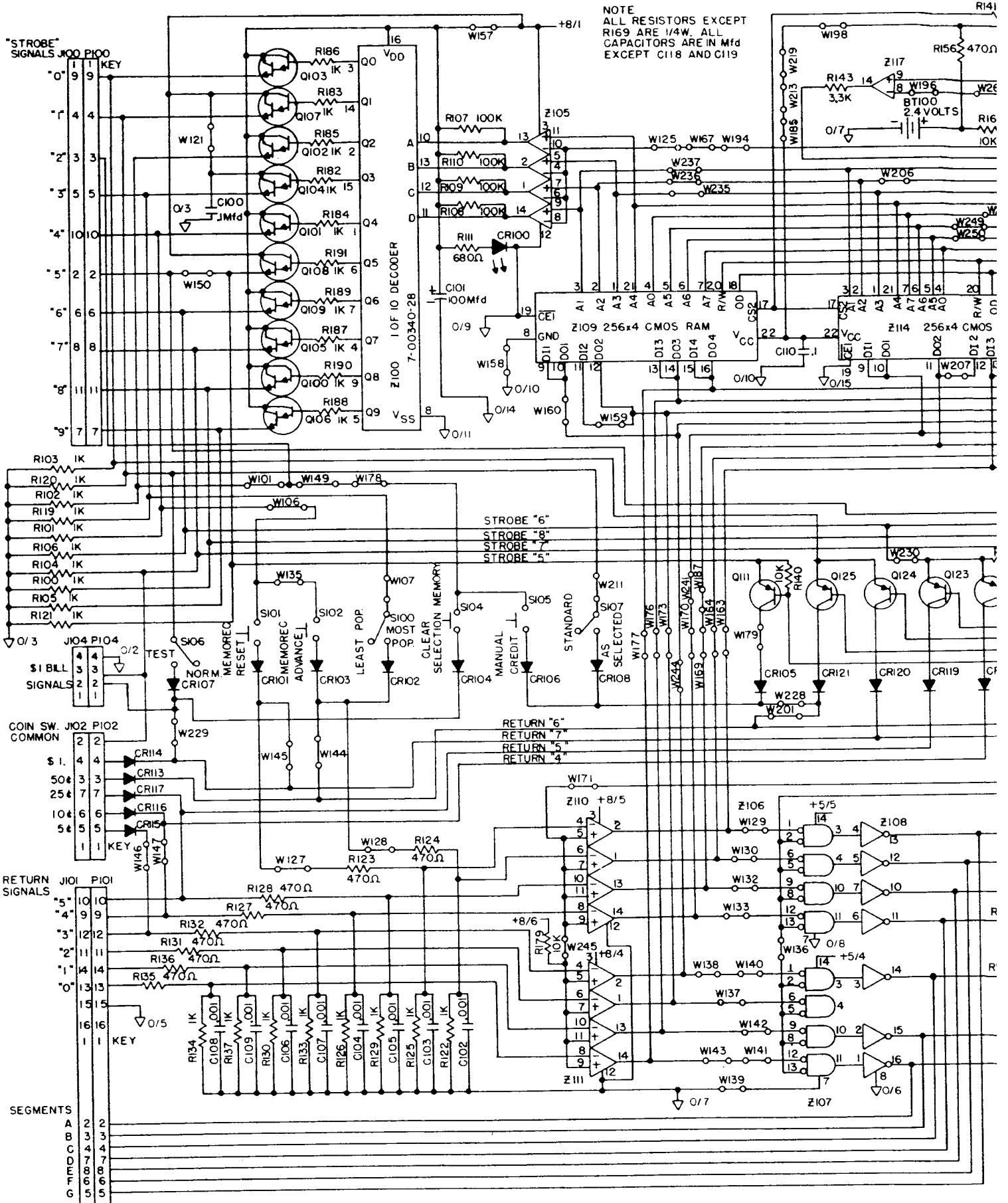
(LEFT) SCHEMATIC DIAGRAM 6 -08871-01

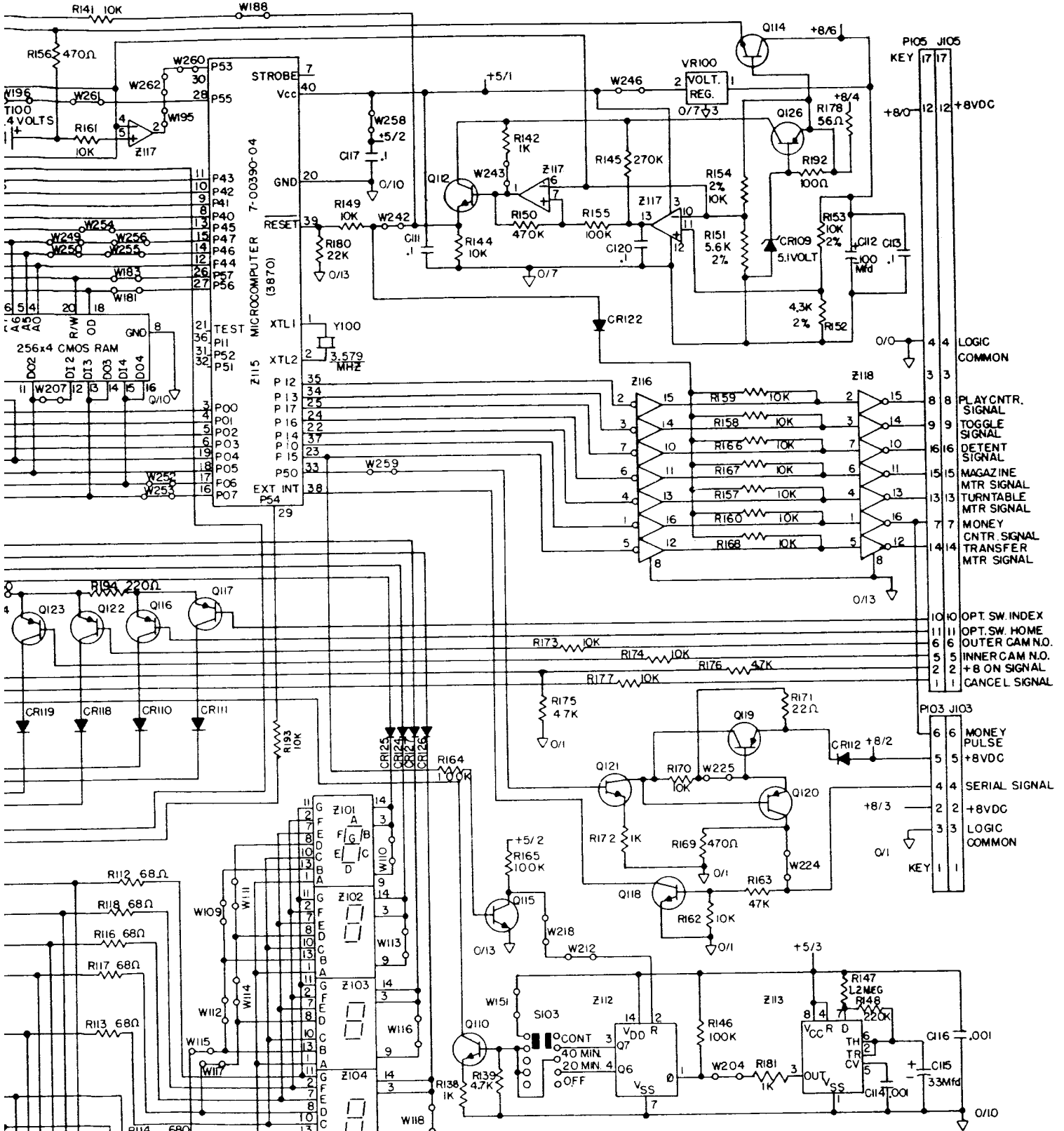


**SCHEMATIC DIAGRAM 6-08871-01 (RIGHT)**



(LEFT) SCHEMATIC DIAGRAM 6 -08871-04





SCHEMATIC DIAGRAM -CENTRAL CONTROL COMPUTER

EQUIV. ENG'G DRAWING. 6-08871-04-Q-2

**MOSTEK -04 BOARD**