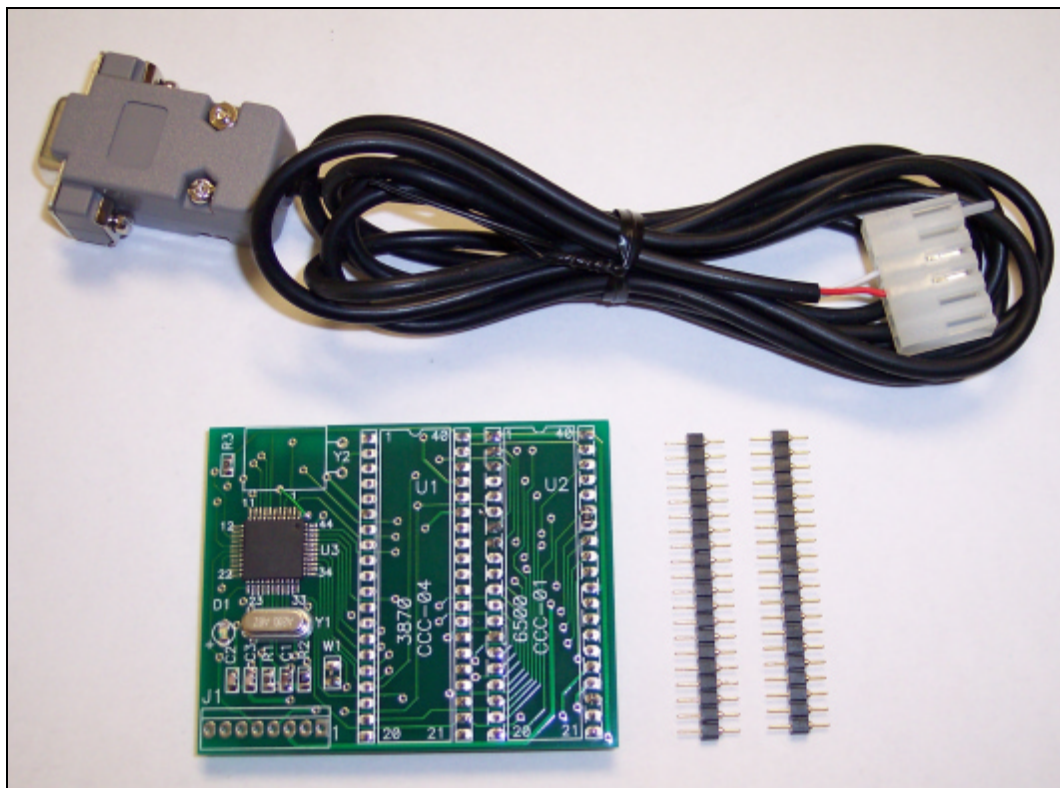


REPAIRING ROWE/AMI R84 - R88 CENTRAL CONTROL COMPUTERS

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

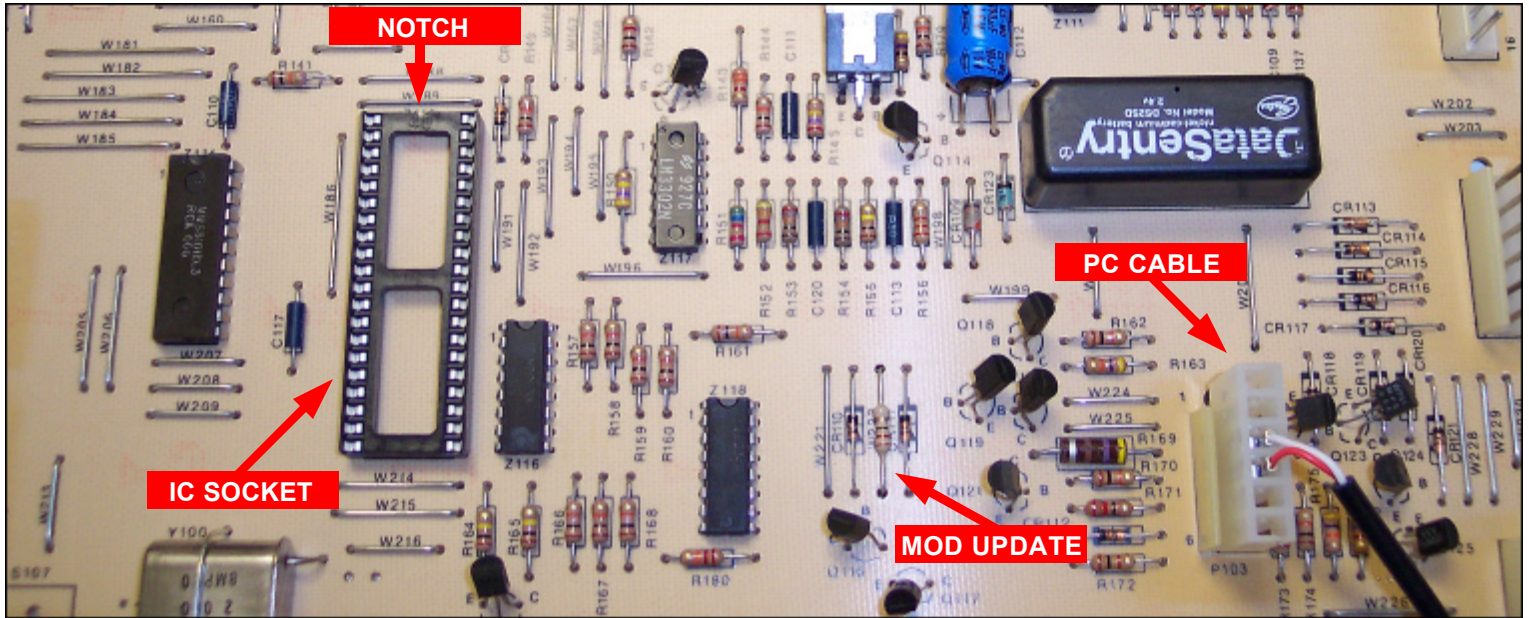


Data Sync Engineering
P.O. Box 539, 2 Footbridge Lane
Blairstown, New Jersey 07825

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FAX: (908) 362-5889

www.datasynceng.com
www.cdadapter.com

PREPARING THE CENTRAL CONTROL COMPUTER CIRCUIT BOARD



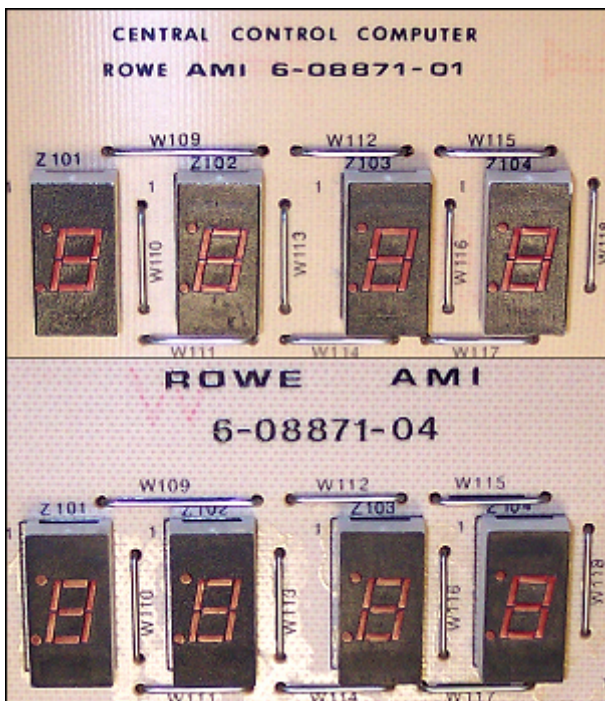
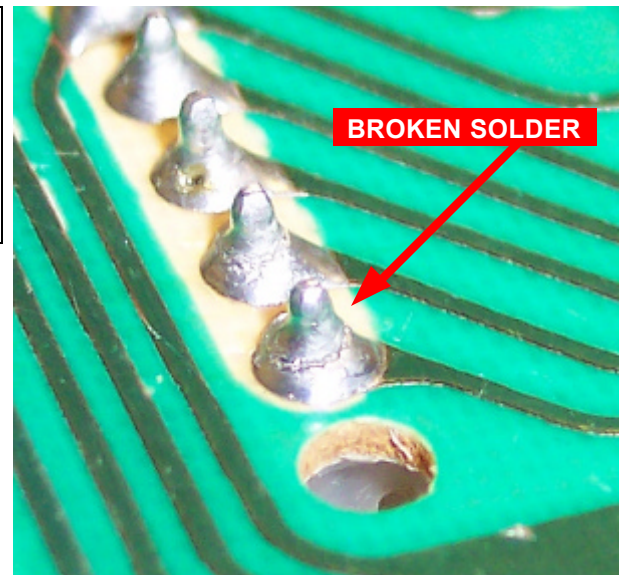
To use the Troubleshooter, you need to remove the custom microprocessor chip and insert a 40-pin IC socket. A low profile, dual leaf type socket, such as 3M part number 4840-6004-CP, is recommended.

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.

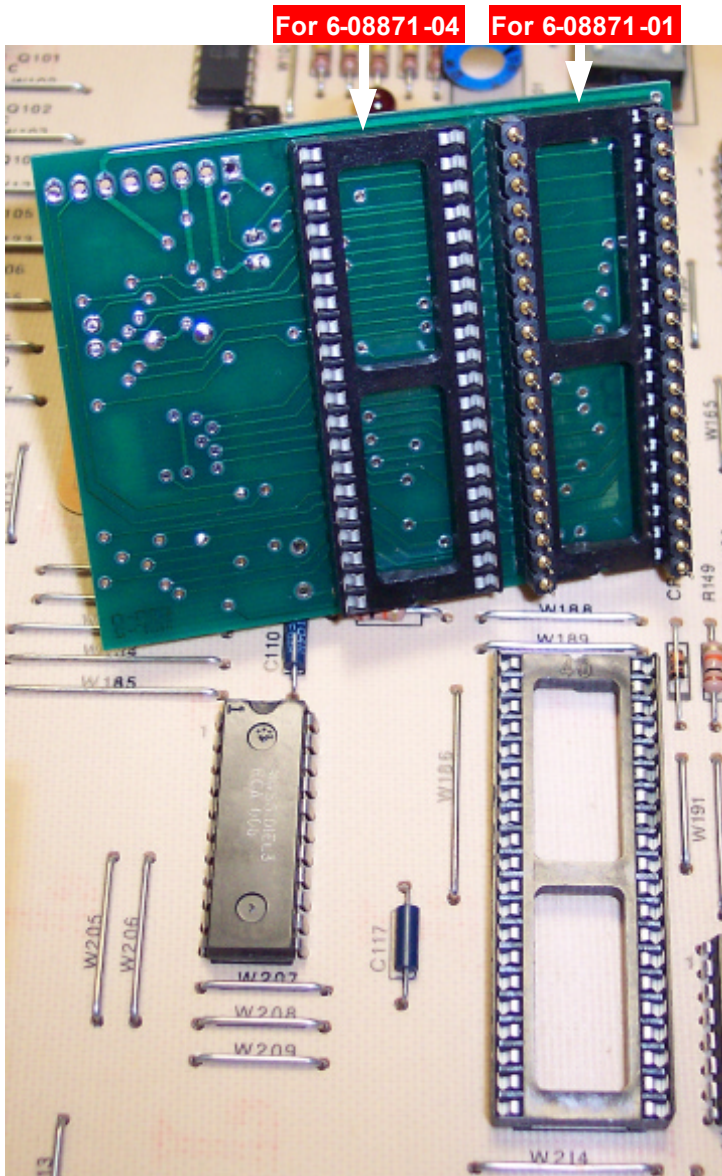
TIP ... A Mod Update was issued for CCC board # 6-09971-01, wire jumper W222 was changed to a 220 Ohm 1/4W resistor.

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.

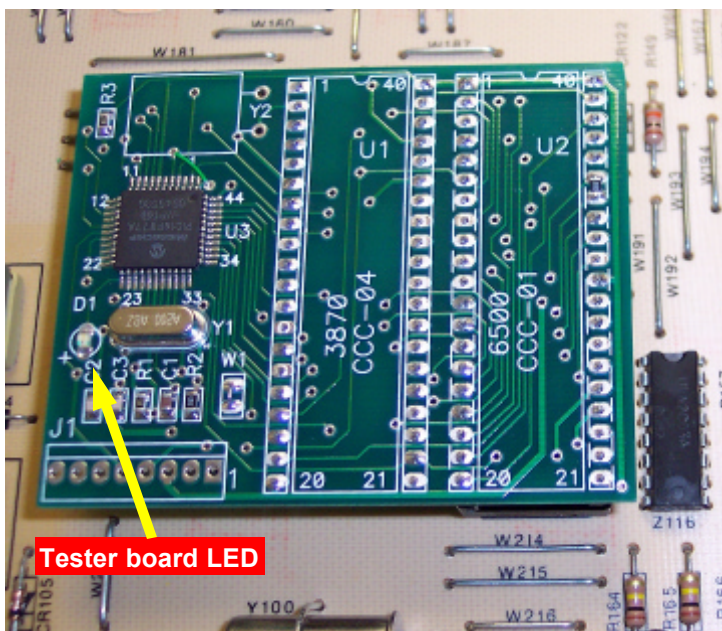


Two circuit board types were produced. The first board was # 6-08871-01 which used the Rockwell 6500 microprocessor IC, the next board was part # 6-08871-04 and used the Mostek 3870 microprocessor. These chips are not interchangeable because of the pinout differences. It is also important to know this 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.



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

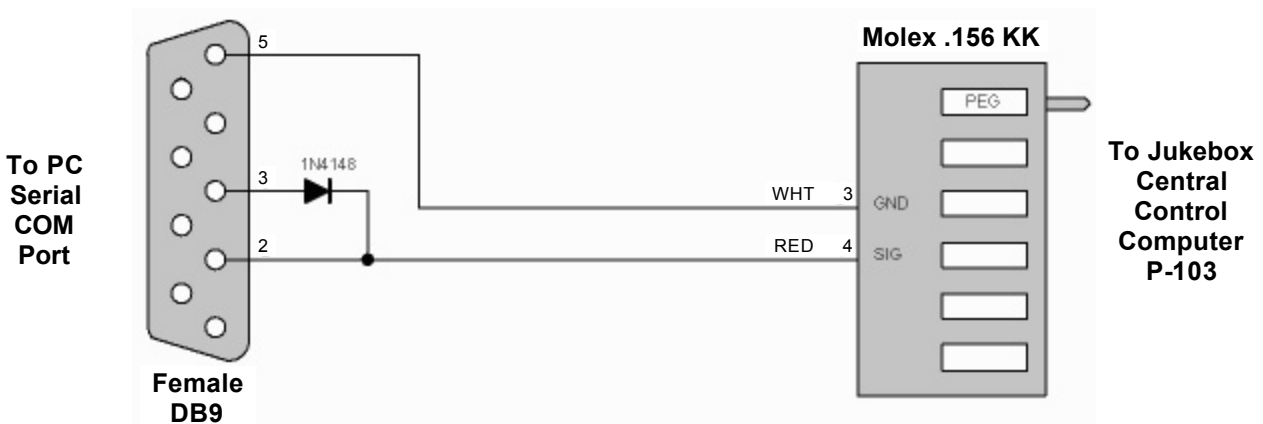
Click Start

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
```

You can also use the Interrogate command function to check the mechanisms' INDEX and HOME opto sensor signals. Move switch to "Service Mode" and press the "Cancel" button to start magazine rotation. HOME is active at record position 99.

```
+Service switch
+Cancel Signal
+Optical Index
-Optical Index
+Optical Home signal
+Optical Index
-Optical Index
-Optical Home signal
+Optical Index
-Optical Index
-Cancel Signal
```

Jukebox LED Display Check

All display digits & LED's should be lit on the jukebox front panel. Check LED segment brightness.

```
CMD>J
- Jukebox LED Display Check
```

Record Mechanism Test

Same as "Run All Tests" except for RAM memory test and display of Pass Number counts.

```
CMD>M
-----
Starting Mechanism Test ...

- Detent on, magazine unlocked
- Magazine Motor on
```

Print RAM Contents

Displays the entire contents of RAM memory in HEX format. The example shows the data that was previously written using "Fill RAM Memory" command. Can be used to locate data changes that occurred over time & temperature.

[illegible]

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
```