

## ASTROCADE MODIFIED CASSETTE CARTRIDGE WITH 28 PIN ZIF SOCKET

### Features

The 28 pin ZIF socket mounted on top of the ASTROCADE game cassette cartridge is compatible with EEPROM and EPROM up to 32KB x 8 bits. A 32KB chip will be multi-carted to four 8KB banks. You can even run a desoldered Astrocade cassette ROM game chip on the ZIF socket.

### Construction Comments

Purchase a 28 pin ZIF socket that can be disassembled. You should see 2 small screws on each end of the socket top, which will allow the socket to be disassembled.

Disassemble the socket so you can mount it on top of the cartridge. Drill 2 holes in the bottom piece (base) of the ZIF socket and countersink each hole for a #2-56 x 1/4" machine screw.

To cut out an area in the top of the cartridge, use masking tape and tape around the perimeter of the area, so you can see what plastic needs to be cut out. Use a variable speed drill and drill holes near the perimeter. Start with a small drill bit. The closer you can get to the taped perimeter, the less plastic you will have to file away. The drill bit can also be used to cut from hole to hole. Finish using files to cut away the remaining area up to the taped markings.

For the ZIF socket, you only need to cut out enough plastic around the ZIF bottom PC pins so you can easily fit a wire wrapping tool around each of the 28 pins.

The 14 pin reroute socket should be located as close to the FRONT of the cartridge as possible, so it will clear the back of the cassette connector.

You can optionally use a 20 pin reroute socket so you can insert the 2 position DIP switch into the top of the reroute socket instead of cutting out a hole in the cartridge for the DIP switch. A 16 pin socket is not recommended if you plan to utilize wired modules instead of small jumper wires.

If you use for the reroute socket, a wire wrap socket instead of a PC socket, it will be easier to wire up the reroute socket. You can trim off the length of the wrapping posts using a wire cutter. Note that a machine tooled WW or PC socket is more challenging when inserting jumper wires into its top holes.

Mount the reroute socket onto a nearly 1/2 x 1 1/8 " piece of vector board. If you use a machine tooled socket, you will likely have to fasten it to the vector board by bending and twisting a small piece of bus or hookup wire on each end of the socket.

Mount the reroute socket/vector board assembly to the cartridge top using two #2-56 x 1/4" machine screws (or smaller). You can add a washer to the screws to recess the socket into the cartridge a little.

Drill 2 holes into the cartridge PC board as shown in the photo, so you can feed one side of the ZIF wiring underneath, then on top of the PC board. Feed 7 wires through each hole.

You will have to cut to length, strip and wrap the ends of the #30 wrapping wire for all 28 ZIF

connections prior to soldering them to the PC board. Color coding is recommended. Otherwise, you will have to identify the wires for pins 15 thru 28 using an ohmmeter. The wiring for pins 1 thru 14 may be visible depending on where you mounted the ZIF socket.

After you solder each wire, use an ohmmeter to confirm the wiring is connected correctly to the appropriate cartridge PC lines 0 thru 25 or the reroute socket. After all the soldering is completed, use the ohmmeter again to confirm all wiring is connected as shown in the ZIF electronic schematic.

The final step is to assemble the cartridge, place a chip into the ZIF socket and insert the appropriate jumpers into the reroute socket. Then place the cartridge into the Astrocade cassette connector. Use an ohmmeter again along with the Bally/Astrocade motherboard schematic from the Bally Service Manual PA-1 (posted on the Bally Alley) to check that all the connections from the chip pins on the cartridge to the Z80 are correct. For the cartridge chip select line CCS (active low), you can place the ohmmeter test lead at U12 pin 13, which is wired to the CCS line.

#### Additional References Attached To This Documentation

6 photos

3 drawings:

ZIF electronic schematic

standard EEPROM/EPROM pin layouts

two reroute socket examples

End Of Document

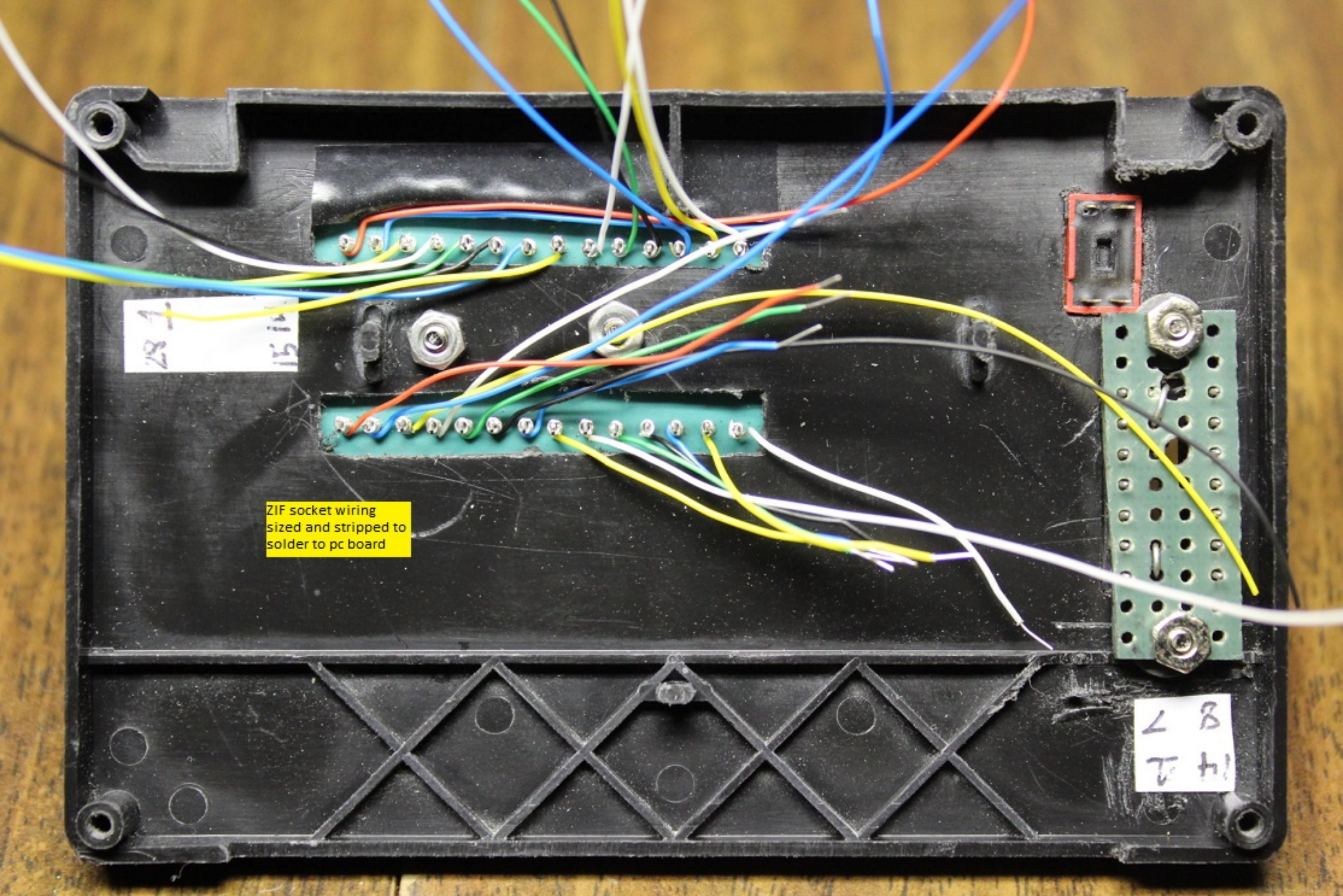
MCM Design

Dec 2020

Astrocade ZIF Cartridge  
EPROM and EEPROM compatible  
up to 32KB x 8 bit chips  
Multi-carted for 32KB with  
four 8KB banks





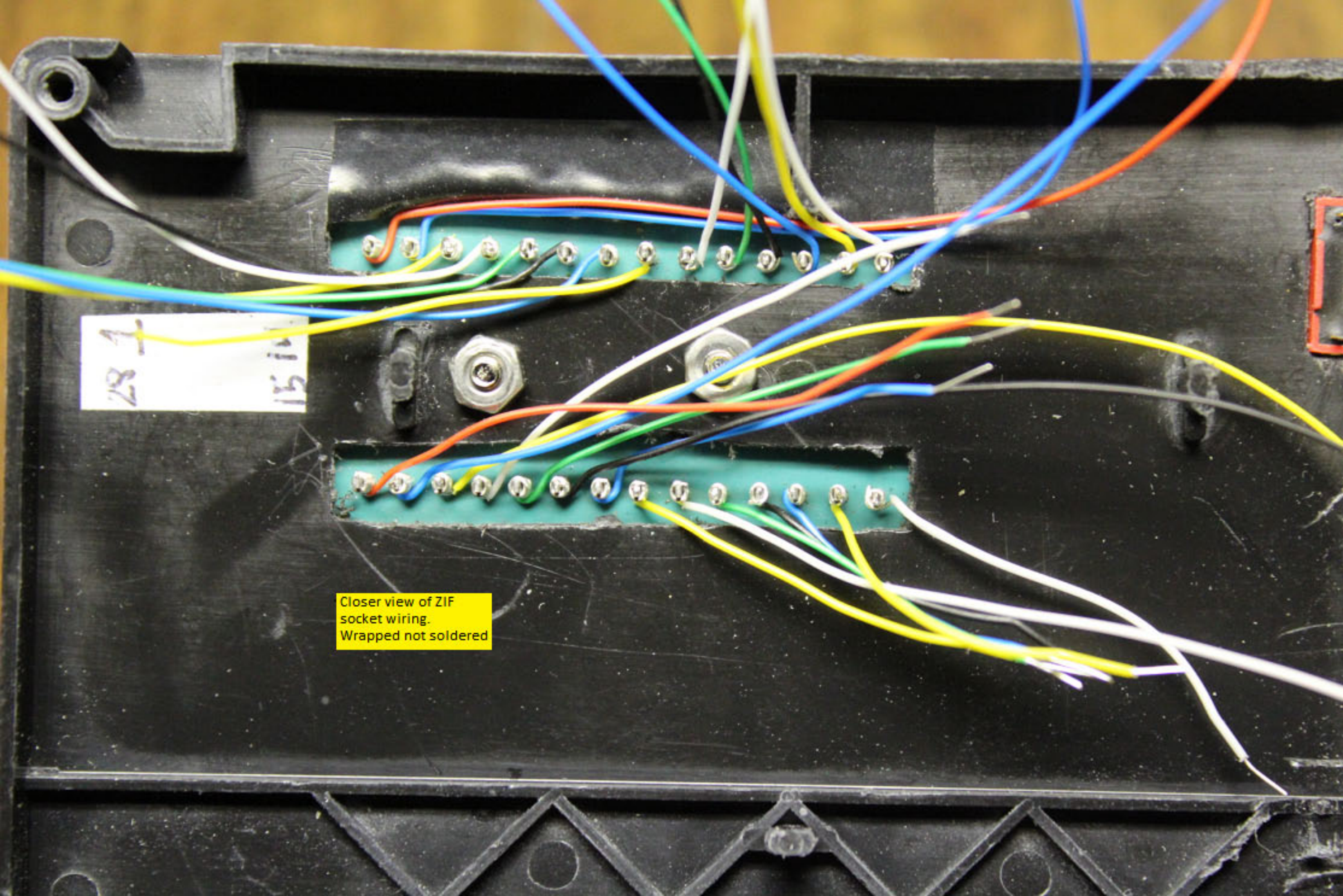


281  
15 pin

ZIF socket wiring  
sized and stripped to  
solder to pc board

28  
15 pin



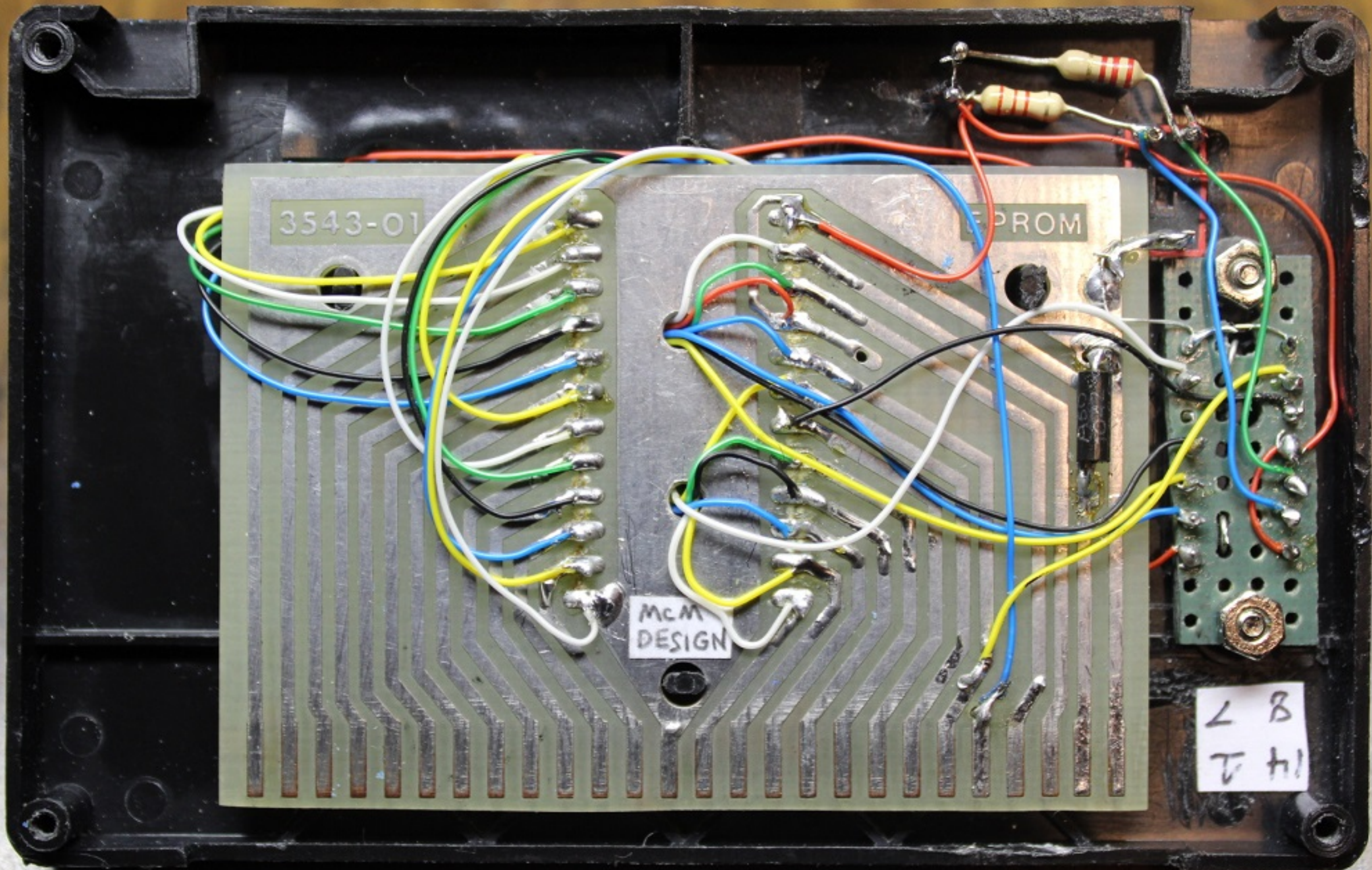


281  
15 in

Closer view of ZIF  
socket wiring.  
Wrapped not soldered

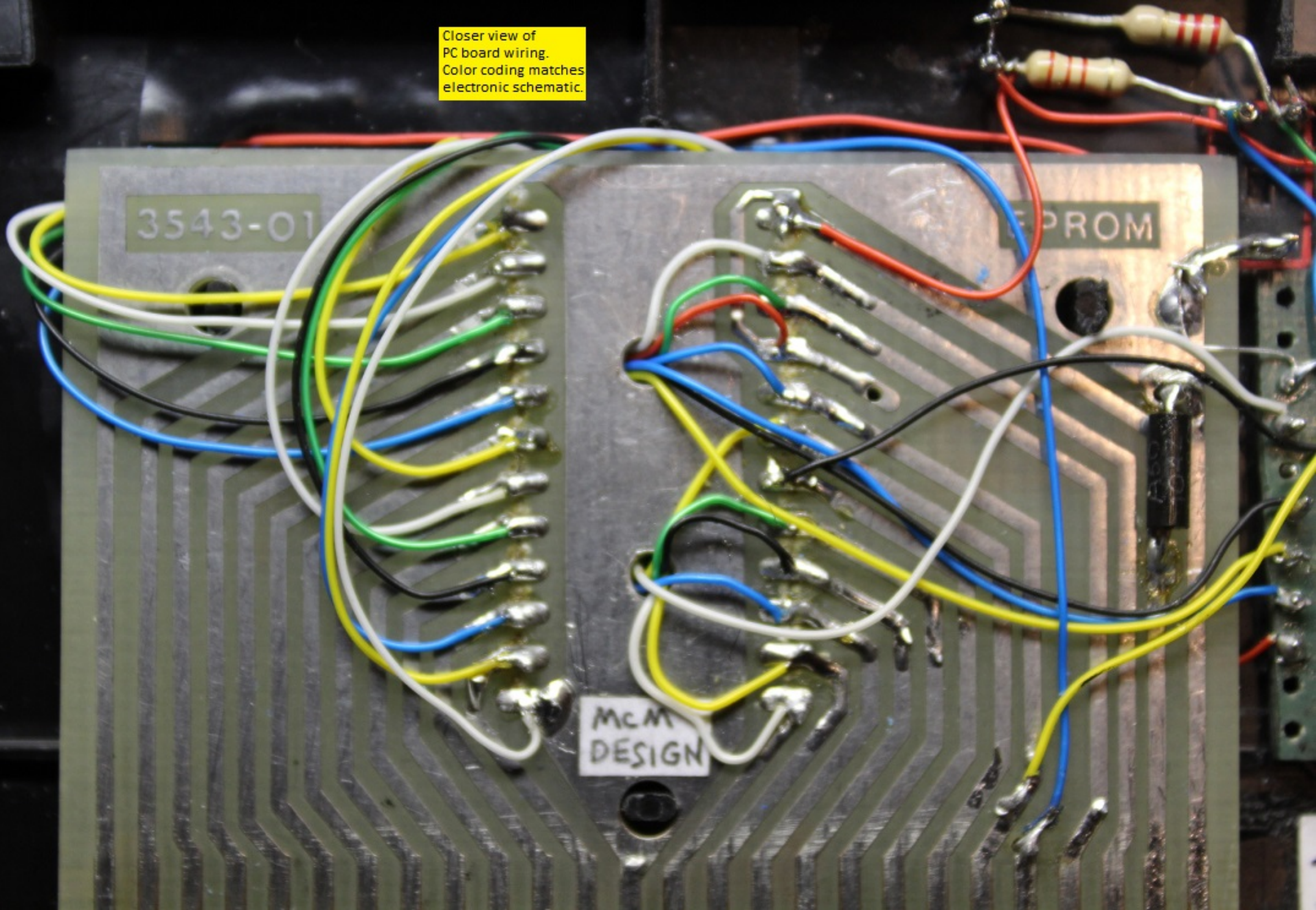


PC and reroute board wiring soldered in place



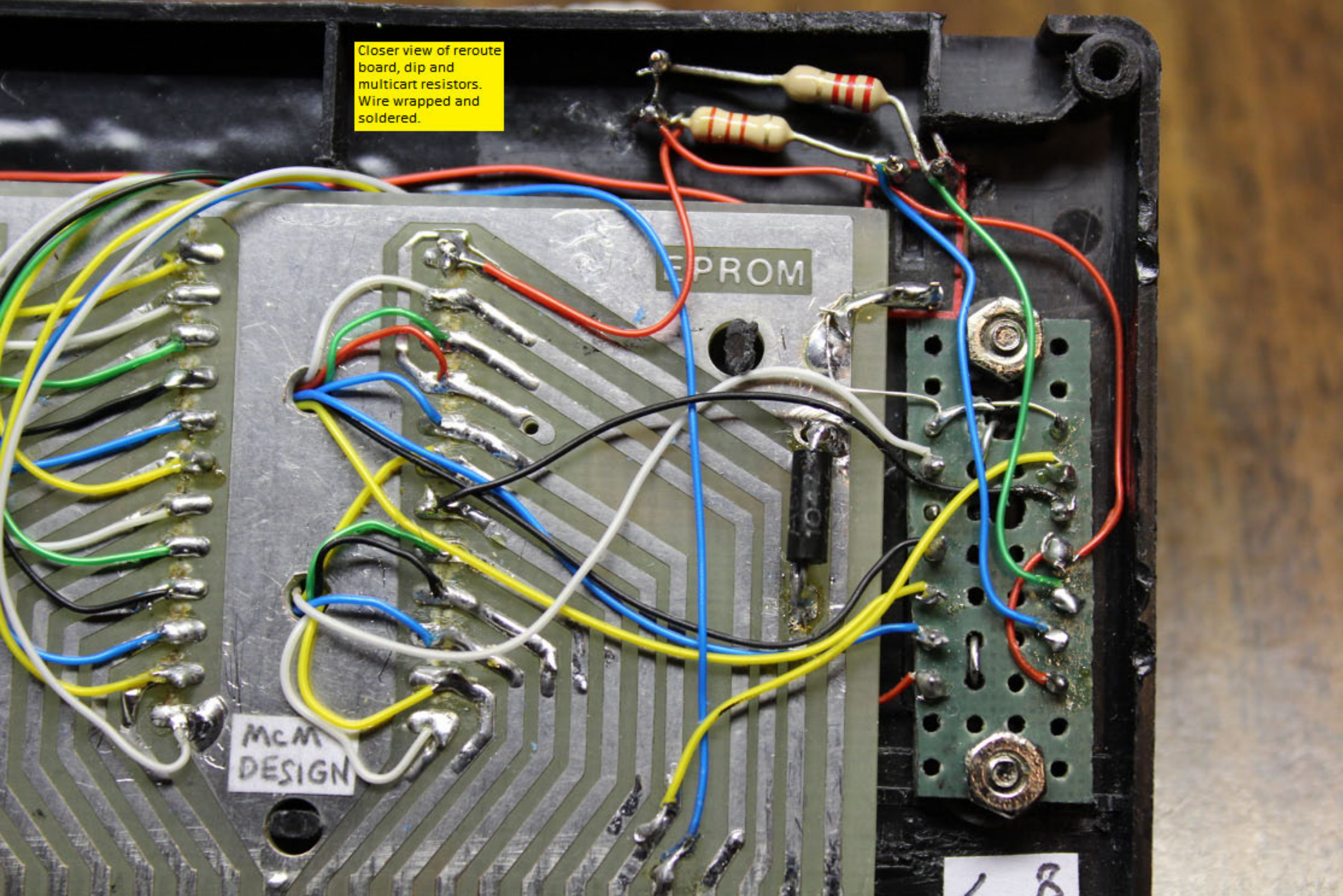


Closer view of  
PC board wiring.  
Color coding matches  
electronic schematic.





Closer view of reroute board, dip and multicart resistors. Wire wrapped and soldered.



EPROM

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DESIGN

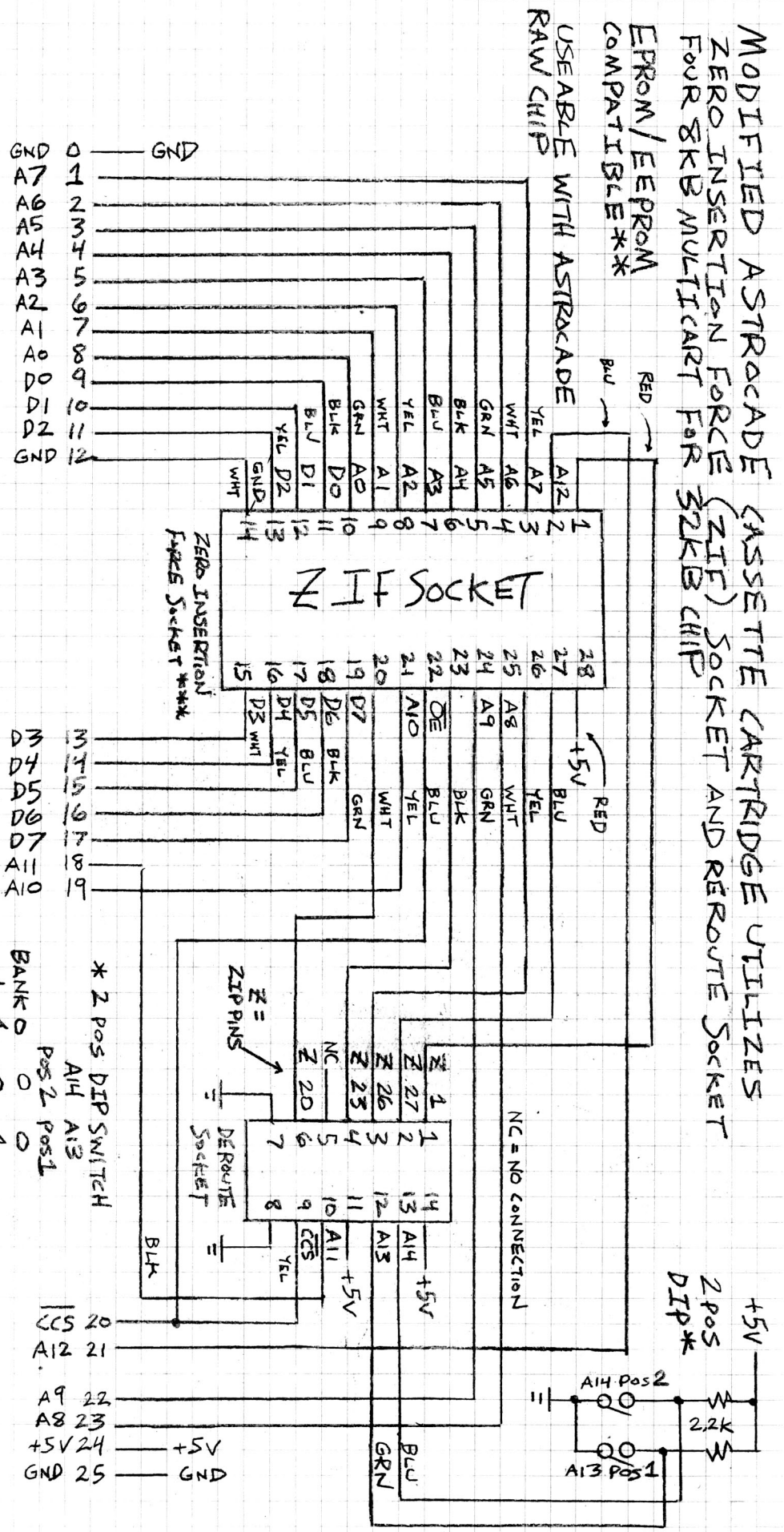
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MODIFIED ASTROCADE CASSETTE CARTRIDGE UTILIZES ZERO INSERTION FORCE (ZIF) SOCKET AND REROUTE SOCKET FOR 32KB CHIP

EPROM/EEPROM COMPATIBLE\*\*

USEABLE WITH ASTROCADE RAW CHIP



### ASTROCADE 26 CONTACT CASSETTE CONNECTOR

CONTACT 0 = LEFT MOST CONTACT, CONTACT 25 RIGHTMOST CONTACT  
CONTACT 24 = +5V, CONTACTS 0, 1, 2 AND 25 = GND

\*\* FOR COMPATIBLE EPROM/EEPROM SEE PIN LAYOUT DWG 2  
USE DIP MODULE OR HOOK-UP JUMPERS TO REROUTE LINES

\*\* \* ZERO INSERTION FORCE SOCKET VARIATIONS ARE FOR ITS PINS 1, 2, 7, 26, 23 AND 20, REROUTE APPLICABLE EPROM/EEPROM PINS PER ITS DATA SHEET. SEE DWGS 2 AND 3.

\* 2 POS DIP SWITCH

BANK	0	1	2	3
A14	0	1	1	1
A13	0	0	1	1
Post 1	0	0	1	1
Post 2	0	0	1	1

WHERE  
0 = SW ON  
1 = SW OFF

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DWG 1



# EEPROM / EPROM PIN LAYOUT (24 PIN CHIP ALSO SHOWN INSTALLED INTO ZIF SOCKET)

FOR USE WITH MCM DESIGN MODIFIED CASSETTE CARTRIDGE UTILIZING 28 PIN ZERO INSERTION SOCKET (ZIF) SOCKET AND 14 PIN REROUTE SOCKET

2Kx8 EEPROM 2816

4 VACANT ZIF PINS \*\*

1	28	
2	27	
A7	3	+5V
A6	4	A8
A5	5	A9
A4	6	WE
A3	7	OE
A2	8	A10
A1	9	CE
A0	10	D7
D0	11	D6
D1	12	D5
D2	13	D4
GND	14	D3

24 PIN CHIP

8Kx8 EEPROM 2864 OR EQUAL \*  
NC = NO CONNECT

\* SEE DATA SHEET

NC	1	28	+5V
A12	2	27	WE
A7	3	26	NC
A6	4	25	A8
A5	5	24	A9
A4	6	23	A11
A3	7	22	OE
A2	8	21	A10
A1	9	20	CE
A0	10	19	D7
D0	11	18	D6
D1	12	17	D5
D2	13	16	D4
GND	14	15	D3

32Kx8 EEPROM 28256 OR EQUAL

A14	1	28	+5V
A12	2	27	WE
A7	3	26	A13
A6	4	25	A8
A5	5	24	A9
A4	6	23	A11
A3	7	22	OE
A2	8	21	A10
A1	9	20	CE
A0	10	19	D7
D0	11	18	D6
D1	12	17	D5
D2	13	16	D4
GND	14	15	D3

2Kx8 EPROM 2716

4 VACANT ZIF PINS \*\*

1	28	
2	27	
A7	3	+5V
A6	4	A8
A5	5	A9
A4	6	Vpp
A3	7	OE
A2	8	A10
A1	9	CE
A0	10	D7
D0	11	D6
D1	12	D5
D2	13	D4
GND	14	D3

24 PIN CHIP

4Kx8 EPROM 2732

1	28	
2	27	
A7	3	+5V
A6	4	A8
A5	5	A9
A4	6	A11
A3	7	OE/Vpp
A2	8	A10
A1	9	CE
A0	10	D7
D0	11	D6
D1	12	D5
D2	13	D4
GND	14	D3

24 PIN CHIP

8Kx8 EPROM 2764

Vpp	1	28	+5V
A12	2	27	PGM
A7	3	26	NC
A6	4	25	A8
A5	5	24	A9
A4	6	23	A11
A3	7	22	OE
A2	8	21	A10
A1	9	20	CE
A0	10	19	D7
D0	11	18	D6
D1	12	17	D5
D2	13	16	D4
GND	14	15	D3

32Kx8 EPROM 27256

Vpp	1	28	+5V
A12	2	27	A14
A7	3	26	A13
A6	4	25	A8
A5	5	24	A9
A4	6	23	A11
A3	7	22	OE
A2	8	21	A10
A1	9	20	CE
A0	10	19	D7
D0	11	18	D6
D1	12	17	D5
D2	13	16	D4
GND	14	15	D3

BALLY ASTROCADE CASSETTE ROM CHIP

4 VACANT ZIF PINS \*\*

1	28	
2	27	
A7	3	+5V
A6	4	A8
A5	5	A9
A4	6	A12
A3	7	CCS
A2	8	A10
A1	9	A11
A0	10	D7
D0	11	D6
D1	12	D5
D2	13	D4
GND	14	D3

CASSETTE ROM 24 PINS

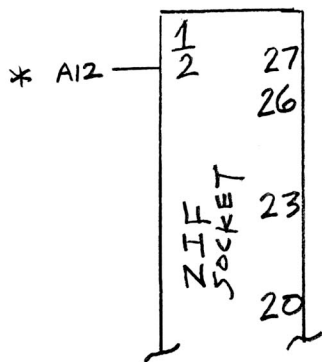
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DWG 2

\*\* NOTE GND PIN OF CHIP MUST BE INSTALLED IN ZIF GND PIN 14



# SOCKET REROUTE EXAMPLES



ZIF SOCKET HAS 5 POSSIBLE EEPROM/EPROM VARIATIONS WIRED TO THE 14 PIN REROUTE SOCKET.

ZIF SOCKET PINS 1, 27, 26, 23 AND 20 ARE WIRED TO THE REROUTE SOCKET AS SHOWN IN DWG 1.

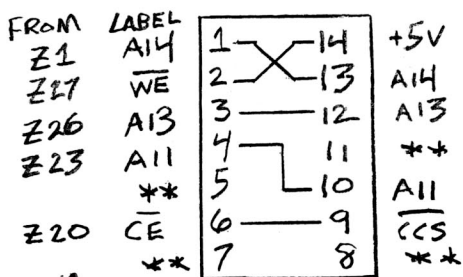
THERE ARE UP TO 5 POSSIBLE PIN VARIATIONS TO CONSIDER DEPENDING ON WHAT CHIP IS INSTALLED IN THE ZIF SOCKET. DWG 2 SHOWS 8 COMMON PIN LAYOUTS.

## \* SPECIAL CASE

WHEN INSTALLING RAW ASTROCADE CASSETTE CHIP IN THE ZIF SOCKET, YOU MUST INSERT A JUMPER WIRE (FOR THE A12 CONNECTION) INTO THE ZIF SOCKET, FROM PIN 2 TO PIN 23.

### EXAMPLE 1

WIRE THE REROUTE SOCKET FOR A 28 PIN, 32Kx8 BIT EEPROM, TYPE 28256

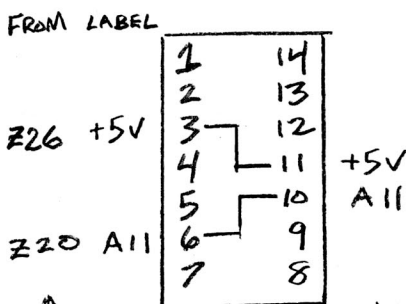


5 JUMPERS REQ'D.  
KEEP WE HIGH ALWAYS.  
\*\* NO JUMPERS AT PINS 5, 7, 8 AND 11

SEE DWG 2  
PIN LAYOUT

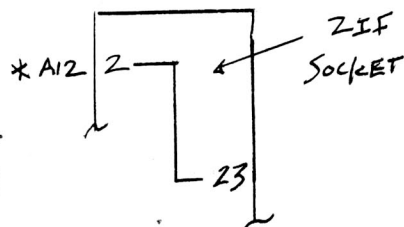
### EXAMPLE 2

WIRE THE REROUTE SOCKET FOR A 24 PIN RAW ASTROCADE CASSETTE ROM CHIP. THE ROM PIN LABELS ARE SHOWN ON BOTTOM OF DWG 2.



2 JUMPERS REQ'D  
PIN 3 TO PIN 11  
PIN 6 TO PIN 10

SEE  
DWG 2  
PIN LAYOUT



INSERT THIS 3RD JUMPER INTO THE ZIF SOCKET. PIN 2 TO PIN 23

NOTE: GND PIN 12 OF ROM CHIP MUST BE IN THE ZIF SOCKET GND PIN 14 FOR THE CORRECT PLACEMENT OF THE ROM CHIP.

