Introduction
by

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There have been many questions about the back up camera replacement and the horizontal picture is reversed. The following diagrams and explanation will show an inexpensive way to wire relays, switching the horizontal picture while not changing the color TV picture.

Diagram 1 shows the unaltered circuit from PMMI. Diagram 2 shows the original circuit changed by adding 2 Bosh relays and wiring them to switch the horizontal picture for the back up camera.

This will a fun project and the cost will be arou nd $25.00 or so and take about 4 to 6 hours depending on how many coffee breaks are taken.

Please remember that I am basing this write up and schematics on my ‘85FC35 and your Coach may be wired slightly different, so locate all connections before starting this project and cutting ANY wires.

Special thanks

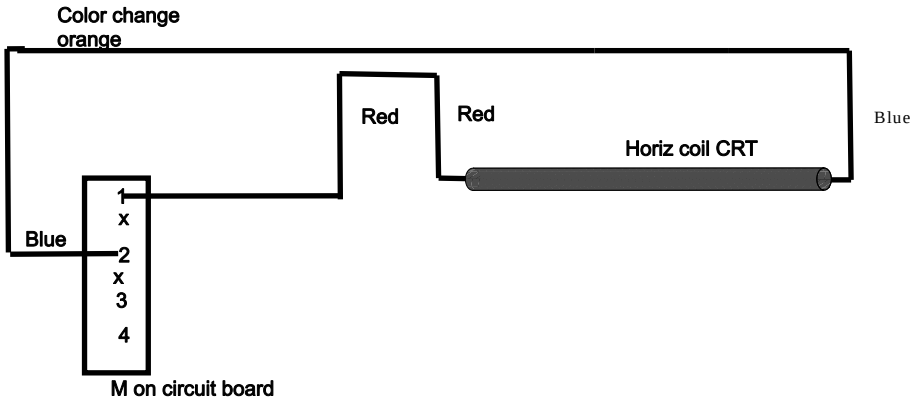
Special thanks goes to Doug and April Hampton, and Gay Foust of PMMI Electronics for sending the original notes and schematics of the modified CTO-911 TV/back up camera set. These folks have really gone out of their way and bent over backwards to help with this project. I recommend PMMI and their products highly.

And to Jeff Miller, ‘84FC35 in Mich. for doing the proof reading of this manual and making suggestions.

Warning

Please remember that there are HIGH VOLTAGES present and even though power is removed from the TV set, high voltage is present at the CRT Anode (large red wire going to a cup attached to the picture tube and looks like a suction cup.) The author nor anyone associated with this manual is responsible for electrical shock. If you not comfortable with working on TV’s, have someone who is perform this modification.

Diagram 1



Unchanged circuit of the PMMI modified CTO-911 TV/Backup camera and monitor

Diagram 2

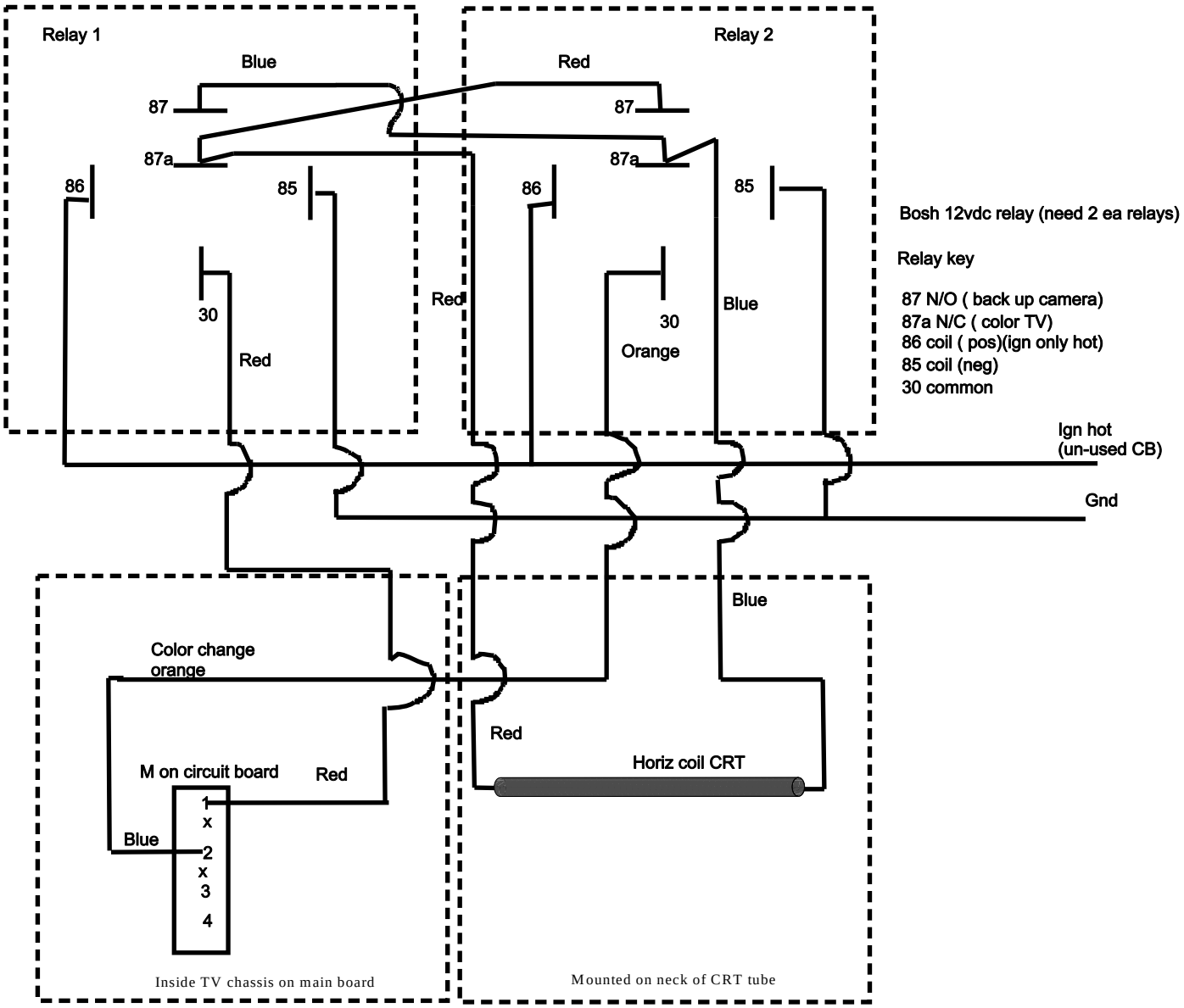
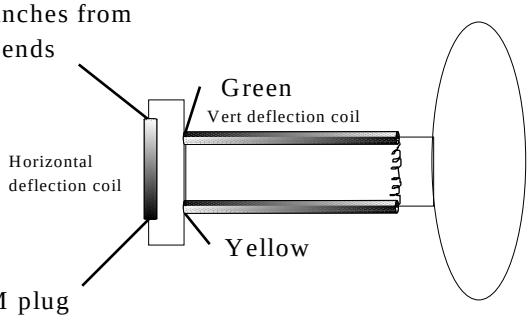

Relay 1
Relay 2
Blue
Red
87
87
87a
87a
86
85
86
85
30
Red
Red
30
Orange
Blue
Bosh 12vdc relay (need 2 ea relays)
Relay key
87 N/O (back up camera)
87a N/C (color TV)
86 coil (pos)(ign only hot)
85 coil (neg)
30 common
Ign hot
(un-used CB)
Gnd
Blue
Color change
orange
Red
Horiz coil CRT
M on circuit board
Red
1
x
Blue
2
x
3
4
Inside TV chassis on main board
Mounted on neck of CRT tube

Figure # 3
(CRT/picture tube)

Red wire from Pin 1 of M plug on TV chassis cut this wire about 8 inches from the deflection coil, strip both ends of insulation about ¼ inch



Blue/orange/blue wire from M plug on TV chassis. C ut this wire about 8 inches from the deflection coil, strip both ends of insulation about ¼ inch

** note from page 5

The red wire from Pin 1 of M plug on the TV chassis stays red to the new circuit

The blue/orange/blue wire from plug M on the TV chassis starts out blue then turns to orange in the multi conductor cable then back to blue on the horizontal deflection coil. It will stay blue to the new circuit from the horizontal deflection coil.

Note

The color of wires in your Coach may differ a little, but the same principal applies

Lets get started

Here is a list of what will be needed.

1. 5 feet of #14 red wire.
2. 5 feet of # 14 blue wire
3. 1 foot #14 black wire
4. 1 foot # 14 white wire
5. 2 each Bosh 12 vdc relays
6. 10 or 12 female spade connectors (blue)
7. 2 ring tongue connectors (blue fits size 8)
8. 4 butt connectors (blue)
9. 2 #8 sheet metal screws (Phillips head)
10. 1 ea 5 to 8 amp circuit breaker (we can use one already in the Coach that is un-used)
11. Roll of electricians tape

Tools

1. Side cutters
2. Phillips screwdriver
3. Stake-on pliers (crimpers)
4. Drill motor and drill for pilot holes to mount the relays
5. Wire ties (medium white?)
6. One quart Crown Royal, glass and ice! Oops *grin*
7. *Optional* soldering iron and solder, shrink fit tubing

Preparations

1. Cut approximately 3 feet of the red and blue wire (even length) strip insulation both ends about ¼ inch
2. Cut approximately 6 inches of red and blue wire (even length) strip insulation both ends about ¼ inch
3. Insert one end of red 3 foot wire and one end of 6 inch red wire into female spade connector and crimp
4. Repeat #3 for blue wire.
5. Slip other end of red 6 inch wire into female spade connector and crimp
6. Repeat #5 for blue wire
7. Cut Approximately 4 inches of black wire, strip both ends of 4 inch and now 8 inch wire about ¼ inch
8. Repeat #7 for white wire
9. Slip one end of 4 inch and 8 inch black wire into female spade connector and crimp.
10. Repeat #9 for white wire
11. Slip other end of black 8 inch wire into ring tongue connector and crimp
12. Repeat #11 for white 8 inch wire
13. Slip other end of 4 inch black wire into female spade connector and crimp.
14. Repeat #12 for white 4 inch wire
15. Place the 2 relays together and tape the bodies to form one unit
16. Locate open a rea on electrical platten in the left front (in overhead) upper load center
17. Using the relays, hold them to the platten and mark mounting holes of relays then drill pilot holes for screws
18. Locate red and /blue/orange/blue wires** on horizontal deflection coil on the neck of the CRT (See figure #3)
19. Measure about 6 to 8 inches from the horizontal coil and cut the blue/orange/blue and red wire.**
20. Strip insulation of both ends of blue/orange/blue and red wire of the horizontal deflectio n coil**
21. Slip the cable end of the blue/orange/blue wire into a female spade connector and crimp**
22. Repeat for the red wire

Now we are ready to start wiring

** see note on page 4

Wiring

Pull out the panel that holds the cb, stereo and back up/TV CRT tube. Remove the upper shroud that covers the CRT tube and set it aside.

1. Find the red 3 foot long with the 6 inch made up wire and crimp butt splice to the red wire on the Horizontal defection coil. (better to make this a solder connection with shrink fit tubing covering the solder joint.)

2. Find the blue 3 foot long with the 6 inch wire and crimp butt splice to the blue wire from the Horizontal deflection coil (better to make this a solder connection with shrink fit tubing covering the solder joint.)

Replace the CRT (picture tube) shroud taking care that the bundle of wires (wire tie bundle in 2 places) are in the cut out hole when the two halves of the shroud are together.

3. Pick up the 2 relays taped together and connect the female spade connector from the red wire from Pin 1 on M plug TV chassis to the number 30 (common) terminal on relay #1

4. Connect the blue/orange/blue (now orange) wire to th e number 30 (common)terminal on relay #2

5. Connect the red wire (3 feet long with 6 inch wire) to pin number 87a on relay #1. Then connect the 6 inch red wire from pin number 87a relay #1 to pin number 87 on relay #2

6. Connect the blue (3 feet long with 6 inch long wire) to pin 87a on relay #2. Then connect the 6 inch blue wire from pin number 87a relay 2 to pin number 87 of relay #1

7. Find the black (4 inch and 8 inch wire) and connect the female spade connector of the 4 inch black wire to pin number 86 of relay #1. Then connect the joint female spade connector on pin number 86 of relay #2

8. Find the white (4 inch and 8 inch wire) and connect the female spade connector of the 4 inch white wire to pin number 85 of relay #1. Then connect the joint female spade connector on pin number 85 of relay #2

9. Mount the relays to the platten by screwing the #8 sheet metal screws through the mounting tabs on the relays.

This leaves the two ends of the black (ign hot) and white (ground) wires dangling with the ring tongue connectors.

10. Locate the strip of circuit breakers and find one that is un-used and connect the ring tongue of the black wire to the circuit breaker. To find the ign on circuit breaker, connect the ground lead of a multimeter to the buss bar with the white wires. Then with the ignition switch off check for 12 vdc on the buss bar connecting several circuit breakers. There should be zero volts dc. Now turn the ignition switch to the on position, (motor need not be running) and check the circuit breaker buss bar again. If 12 vdc present you have found it.

11. Locate the ground buss bar and connect the white (ground) ring tongued connector to it.

On to the check out!!

Check out of the system

1. Put everything back into place.

2. Switch on the TV/back up unit.

3. With the ignition switch off, normal TV should be seen.

4. Switch on the ignition and the back up camera should have video and the Horizontal picture will now be the right way.

Done!!!!!!

Oh yes, Now pick up the empty glass, add ice and fill glass ½ full of Crown Royal!!!!


relay 1
relay 2