Adding a Flashing Fluorescent Control Panel Light to a UDOT

v1, 2018-12-29 (CSR – i86time)

What you will need:

Boards

1) Fluorescent flashing controller (FFC), A080-91659-C383

2) Relay Control board (RCB), A080-91661-B000

3) 90412 Rev D power supply (the EDOT page in the manual shows Rev C in the schematics, but to my knowledge only Rev D has the required AC sync circuit)

4) The UDOT board needs to be jumpered for Environmental play or patched ROMs installed

Hardware

1) Lots of wire, some wire nuts and/or in-line splicers. The logic board connects use thinner gauge wire (20 or 22ga), while the power connections for the lights/flasher use a thicker gauge (16 or 18ga). If you can get colors to match the schematics, even better.

2) An assortment of AMP .084 male and female pins, .156 female pins and/or a tool to insert wiring into the .156 IDC connector already in use on the SSIO, a 12 position (4x3) AMP .084 male housing (RCB –J1), a 4 position KK .156 housing (RCB -J2) and a 10 position KK .156 housing (FFC- J1). Optional is a 23 position KK .156 housing for the J5 SSIO connector and key inserts for the KK connectors, if desired.

3) Either the combo ballast/transformer assembly from an EDOT or equivalent parts. A 115VAC->12v single primary/dual secondary transformer should work. The TRIAD F12-200 is confirmed to work (but has PC mounts) and the Hammond 266F12B should work based on specs.

4) In the event you break or damage the lamp holder when trying to remove the wiring, you will need extra ones of those. You may need one anyway based on what lamp holder was originally installed (see instructions below).

Assembly:

It is easier to get exact wire lengths if you mount your boards in the back of the UDOT cab before assembly.

1) On the 90412-D power board, find connector J5. Run a wire from either pin 4 or 2 (+5v) to pin 7 of the fluorescent flashing controller (FFC). Both of these should currently be in use. You may either use an in line splicer or remove the pin from the J5 connector, cut it off and connect the original wire and the new wire and terminate with an .084 AMP female pin on the connected wires and place back in J5 connector. Terminate the other end of this wire with a .156 pin for connection to position 7 of the 10 position housing for the FFC.

Find the pin 8 hole on the J5 connector, this should be an empty ground connection. Install an .084 AMP female pin onto a length of wire and place into connector. Terminate this wire with a .156 pin for connection to position 6 on the FFC housing.

Locate connector J4 on the 90412-D, find pin 14 (this should be empty). Install an .084 AMP male pin onto a length of wire and place into connector. Terminate this wire with a .156 pin for connection to position 10 on the FFC housing.

Find the pin 7 hole on J4 (this should be empty). Install an .084 AMP male pin onto a length of wire and place into connector. Terminate this wire with a .156 pin for connection to position 9 on the FFC housing. Along with J4 pin 11 (see #3 below) these create the AC sync circuit.

2) On the SSIO board (top board of stack), find connector J5. Run a wire from pin 17 (empty) to pin 3 of the FFC housing. The SSIO will have an IDC connector from the factory. You can either replace this with a 23 position KK .156 housing (you'll need to cut and re-pin all wires), or simply force the wire into the IDC connector with the proper tool (a medium size jewelers flathead works adequately).

3) On the relay control board (RCB), run a wire from connector J1 pin 1 (KK .156 4 position housing) to pin 11 on J4 of the 90412-D (should be empty, female AMP .084). Finally run a wire from pin 4 of the J1 housing on the RCB (.156) to pin 2 (.156) of the FFC housing. [**Note, the FFC schematic has the labels of pin 1 (background) and pin 2 (strobe) switched; the collector of Q1 is the strobe signal on pin 2.**]

For the connections to J2 of the RCB, you will now need the 12 position AMP connector. Cut two lengths of wire long enough to reach the light fixture from the RCB. Terminate one end of each with a female AMP .084 and place in positions 6 & 9 of the RCB. Facing the RCB, positioned in the cab with the relay at the top, the pinout looks like this:

x-9-6-x
x-x-x-x
x-x-x-x

4) To power the transformer for the flashing, run some 16ga wire from the power chassis (suitcase) to the transformer/ballast assembly. Find J3 on the suitcase, pins 8 (0V, neutral) and 13 (115V, hot). The schematic shows them as being used for a fan, but no UDOT seems to have one, so it should not require any splicing. Terminate one end of each wire length with an AMP male .084 pin. Place the end of one length in the pin 8 (0V) position and the end of the other length in the pin 13 (115V) position.

5) If you have the transformer/ballast assembly from an EDOT, the rest is fairly simple. Connect the 0V end from the suitcase to the white/brown wire on the primary of the transformer with a wire nut. You should notice that this also has a splicer that connects this wiring to one end of the ballast on the assembly. Now, connect the 115V end from the suitcase to the orange/blue wire on the primary of the transformer. Connect an additional length of wire (long enough to reach the light fixture) to these two wires and tighten down with a wire nut.

Looking at the light fixture, you will see that each end has a lamp holder, and the bottom of each lamp holder has a 'side' such that for the fixture that is present in a UDOT, there is one wire per 'side' totaling 2 wires per end holder (A/B and C/D, 4 wires total- see crude drawing below). With the upgrade, there will now be 2 wires on each 'side' (4 wires per holder, 8 wires total). If for some reason the holder in your fixture only has one 'socket' on each side of the holder, you will need to either splice the wiring together as noted below and insert a single wire end into the holder or buy the correct holder with two sockets as it is unlikely the extra wire will physically fit.

View from bottom of fixture

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|---- A          C----|
|                     |
|                     |
|---- B          D----|
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You can start by removing the line filter (if installed) and the ballast on the fixture, leaving only the bare fixture. You may re-use wires, but if you ever want to revert it to stock, I recommend not messing with any of it and just cutting new wire. It is difficult to remove the old wiring from the holder, so use caution. I had luck by gently prying up the cardboard backing and bending back the 'catches' that keep the wire in place, allowing them to release. Once this is done, remember to bend them back so they hold the new wiring when inserted. Otherwise, just remove them and use new ones.

From the secondary (output) side of the transformer, there should be 4 wires total, a black (6V, hot) and white (0V, neutral) form one pair and an orange (6V, hot) and yellow (0V, neutral) form the other secondary pair. You will need to cut 4 lengths of wire which will reach the light fixture from wherever you have placed this transformer. Here is where using 4 different wire colors comes in handy.

a) Cut enough wire to reach the light fixture from the free wire of the ballast assembly. Attach this wire and the wire from white (0V) to 'position' A.

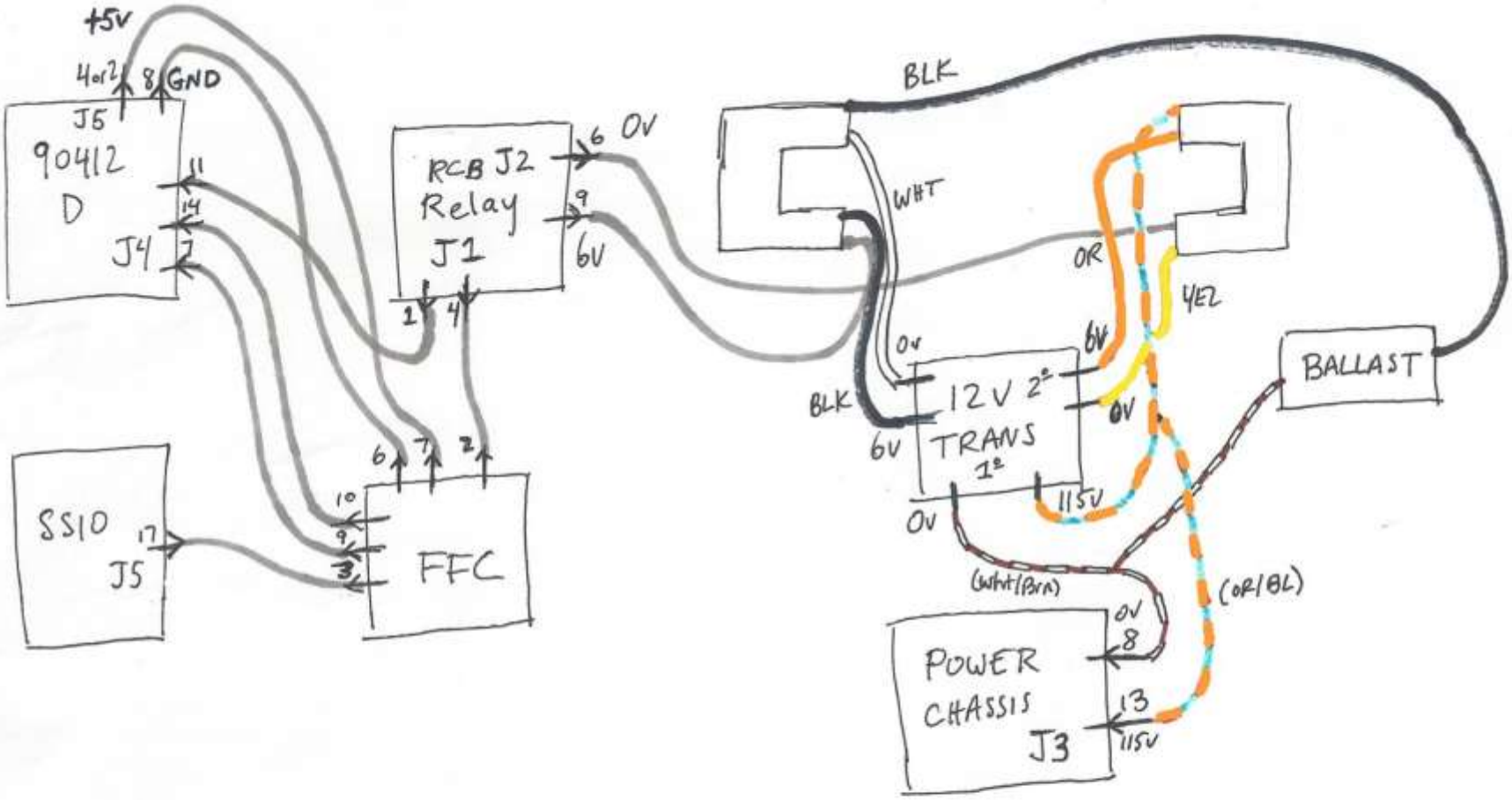
b) Attach the wire from RCB J2-9 and the wire from black (6V) on the transformer to 'position' B.

c) Attach the long wire that is spliced to the orange/blue wire from the 115V suitcase / transformer primary (input) and the orange (6V) from the transformer secondary (output) to 'position' C.

D) Finally, attach the wire from RCB J2-6 and the wire from yellow (0V) on the transformer to 'position' D.

If you don't have the original ballast/transformer assembly, simply follow the primary and secondary locations as noted above and you'll be OK.

That's it. Fire up the game, go into test mode and test the flashers.



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Control Panel Flashing Fluorescent Wiring Diagram