

ADDING AN EXTERNAL ENLARGER TIMER TO A CHROMEGATROL

SUMMARY

My Omega D5-XL had some timer problems. For reference, this model is c.1979 and equipped with the Super Chromega D Dichroic II Lamphouse. That uses the Cat. No. 471-029 enlarging lamp, with original spec of 250W/22.5V, quartz halogen with integral dichroic reflector.

I modified the Chromegatrol 412-040 power supply so that I could control the enlarger lamp on-off time using an external timer. (I have a Gra-Lab 300. Any timed receptacle will work.)

I did this by adding a standard computer-type AC power connector to the Chromegatrol back panel.

This provides a separate place to supply 120V power to certain output terminals taken off the main Chromegatrol circuit board, the ones that go to the main lamp. The original timer circuit board and its control relay K1 are no longer powered and remain in place, bypassed. The wiring modification is reversible, in case that is important.

My external timer now controls the main enlarger lamp. The enlarger cooling fan and small upper panel lamp operate the same as before, switched on from the original Chromegatrol main power switch S1. These electrical items and the main enlarger lamp are still powered from the original Ferro Resonant Stabilizer in the Chromegatrol. Only the timing and switching functions were relocated.

DESCRIPTION

The official name for the AC power connector is IEC type C14 male panel mount, standard outline attached. A computer-type 3-prong power cord plugs into this IEC socket on the back of the Chromegatrol. The other end of the cord plugs into my Gra-Lab or other timed outlet. (The Gra-Lab also handles my safelight switching.)

The Chromegatrol main power switch S1 still operates the 120V cooling fan and the small upper panel lamp in the Dichroic II filter housing (471-031, 6W). These accessories stay powered on whether or not the main enlarger lamp is lit, per original design.

The Chromegatrol internal timer circuit board and its control relay K1 are not powered and not used.

Please reference the Chromegatrol 412-040 schematic, available from the helpful and generous users at Photrio and others, and especially Jim Olliver's enlarger web site.

These controls are disabled:

- S4 and S5 timer seconds selectors (along with DS1 and DS2 decade switches)
- S2 Expose switch (which formerly started the internal exposure timer countdown)
- S3 Print-Focus selector (which toggled between main lamp power and safelight power)
- J4 Foot switch jack (which duplicated the S2 & S3 functions remotely, at floor level)

These changes could allow anybody with a bad Chromegatrol timer board to substitute an external timer and still use the original heavy-duty Chromegatrol power supply and lamp cable.

Other modifications are certainly possible. In my own case, “other modifications” were not considered. I merely needed to move the internal timer functions off-board, to external. The wiring changes were minimal and reversible.

The schematics were immensely helpful. In the process of making these changes, I found it necessary to trace and identify all connectors and wiring. Those details were not part the schematics. And so I placed them on there, and reported what I did, here. How or whether you use that information is up to you.

I am distributing the terminal numbering and lamp panel connector wiring and color coding information, as found on my unit. I hope this information might help others who wish to take the responsibility of making these or similar changes.

I greatly appreciate all the donated information on this equipment. I am trying to pay you back. Thank you all very much!

Larry

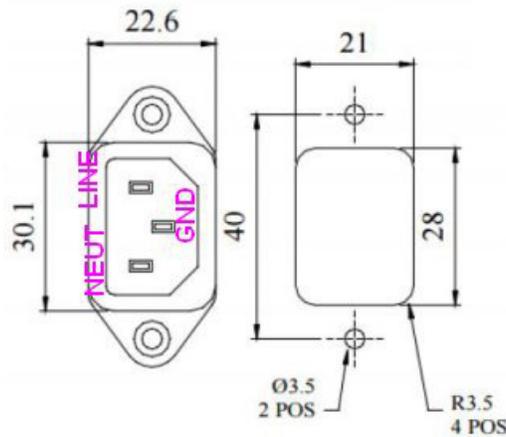
(LWeaver LLC)

First I will show where I mounted the new AC inlet connector on the back panel.
Second, I show the circuit board photo that identifies terminal numbers on my Chromegatrol 412-040.
Third, I will list the (5) wiring modifications I made.
Last, I will show the marked-up schematics with color coding listed, and where I made connections.

This includes the original Cinch-Jones 6-pin plug and socket connectors and the upper panel / lamphouse wiring. (as found on my D5-XL, with Super Chromega D Dichroic II lamphouse)

BACK PANEL: I mounted a “C14 Male Panel Mount IEC connector” on the Chromegatrol back panel first. This required sawing three sides of an opening next to the edge to use the limited internal space.

Here is the outline of the male panel connector in mm, and I chose to mount it at the far left side of the back panel. So my three cuts were two 21mm horizontal cuts, separated by a 28mm vertical cut.



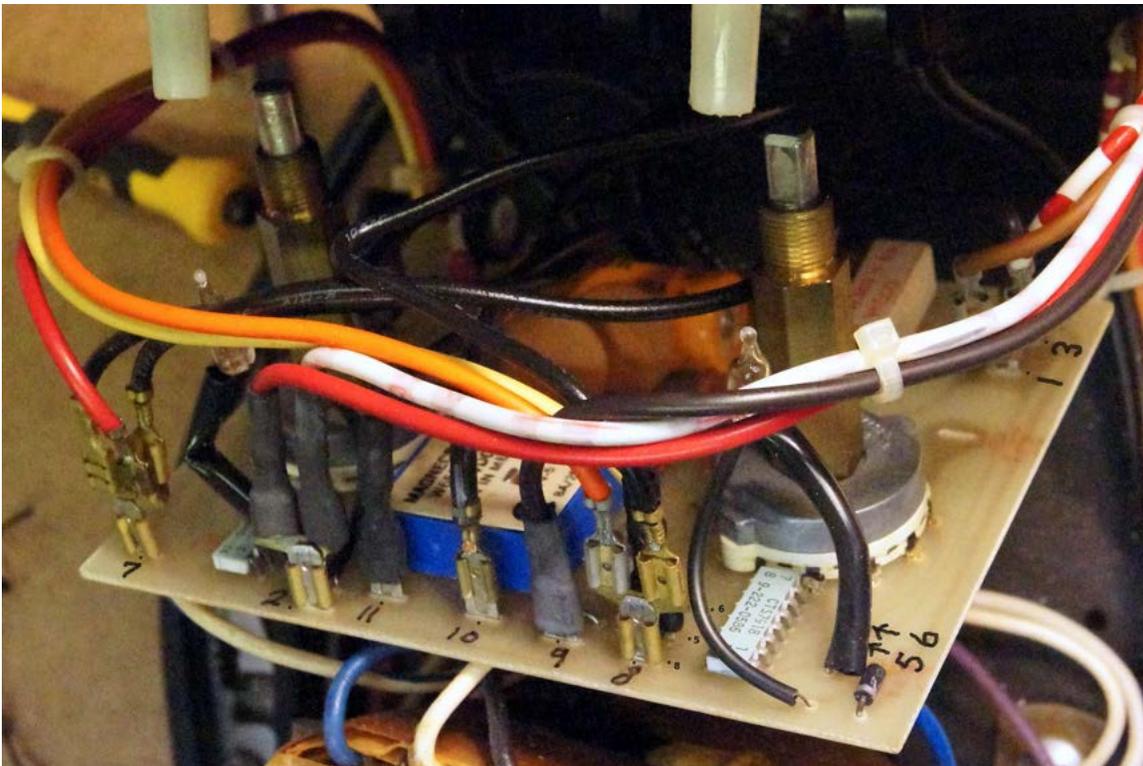
Cutting and drilling made an awful mess of steel filings. I vacuumed and brushed and ran a magnet around to remove the debris. I didn't have a nibbler capable of chewing that thick steel.

Here is the back panel view after installation. The new socket plugs into my Gra-Lab timer.



CIRCUIT BOARD TERMINALS: Chromegatrol terminal positions, numbered as they show on the 412-040 schematic diagram. Without the “E”, so terminal “E7” or “E2” is marked on the board here as simply 7 or 2. View is from the top of the cabinet, down toward the base, while standing in back of cabinet, as if peering down between the front panel and the circuit board mounted behind it. The circuit board has been pulled away and tilted back from the front panel at top of frame. (back and down toward the transformer windings) And so most of the numbered terminals visible here are actually along the top edge of the circuit board. The numbers 11-10-9-8 would be upside down after reassembly.

Left to Right: Terminals are #7 (red, black, and black wires ganged together), #2 (ganged), #11, #10, #9, #8 (ganged). Terminals #5 and #6 are obscured behind #8 in this view, in the positions indicated. Then at right of photo, #1 (ganged) and #3. Verify and double-check the positions on any other board. Here the positions can be identified by referring to the wiring color code I put on the schematic.



Modifications made:

1. Disconnect E2 from circuit board (It is two wires ganged together: Red, White with Violet trace) and tape or heat shrink to insulate the bare wire end connector. (NOTE: This disconnects the timer circuit board and its K1 control relay coil.)
2. Disconnect E10 (Black) and E9 (Black) from circuit board and jumper these wire ends together using a short length of wire and two male spade-lug connectors. Tape or heat shrink to insulate bare connectors. (NOTE: This converts the Safelight Outlet J5 into a fused accessory outlet so that it always passes line voltage 120V, whenever the Chromegatrol power switch S1 is on.)
3. Disconnect E1 from circuit board (ganged Brown, White with Red trace). Use a spade lug connector and length of wire to extend this E1 double wire to the NEUTRAL terminal of the new IEC connector. Tape or heat shrink to insulate bare connection.

4. Disconnect E11 (Black) from circuit board. Use a spade lug connector and length of wire to extend this E11 wire to the LINE terminal of the new IEC connector. Tape or heat shrink to insulate bare connection. (I think I used #18 or #16 wire for connections.)
5. Connect the IEC connector ground terminal to the safelight outlet ground terminal, or other chassis ground.

That's all. Then I attached an ordinary 120V computer power cord (it has an "IEC C13" end) from the Chromegatrol back panel into my Gra-Lab timed outlet. The Chromegatrol power cord is plugged into the wall receptacle just as it always was.

When the Chromegatrol main power switch S1 is on, the enlarger cooling fan and the filter panel illuminator lamp are on, just as they always were.

When my external timer is timing the exposure duration, the new AC supply point from my Gra Lab into the Chromegatrol is energized.

This places timed 120VAC through the 'Black E11 hot wire' onto primary Terminal 1 of the main transformer T1. The 'Brown E1 neutral wire' goes to the White primary Terminal 2 of the main transformer T1.

In this way, the switched external timer voltage energizes or de-energizes the Chromegatrol transformer T1 primary winding directly. This performs the same function as the internal timer, in the same manner, in place of using the original Omega circuit board and its control relay K1.

Attached next, on the final two pages, find diagrams:

SCHEMATIC DIAGRAM MARKED WITH WIRE COLOR
ADDENDUM SHOWING PLUG, CABLE, LAMPHOUSE WIRING

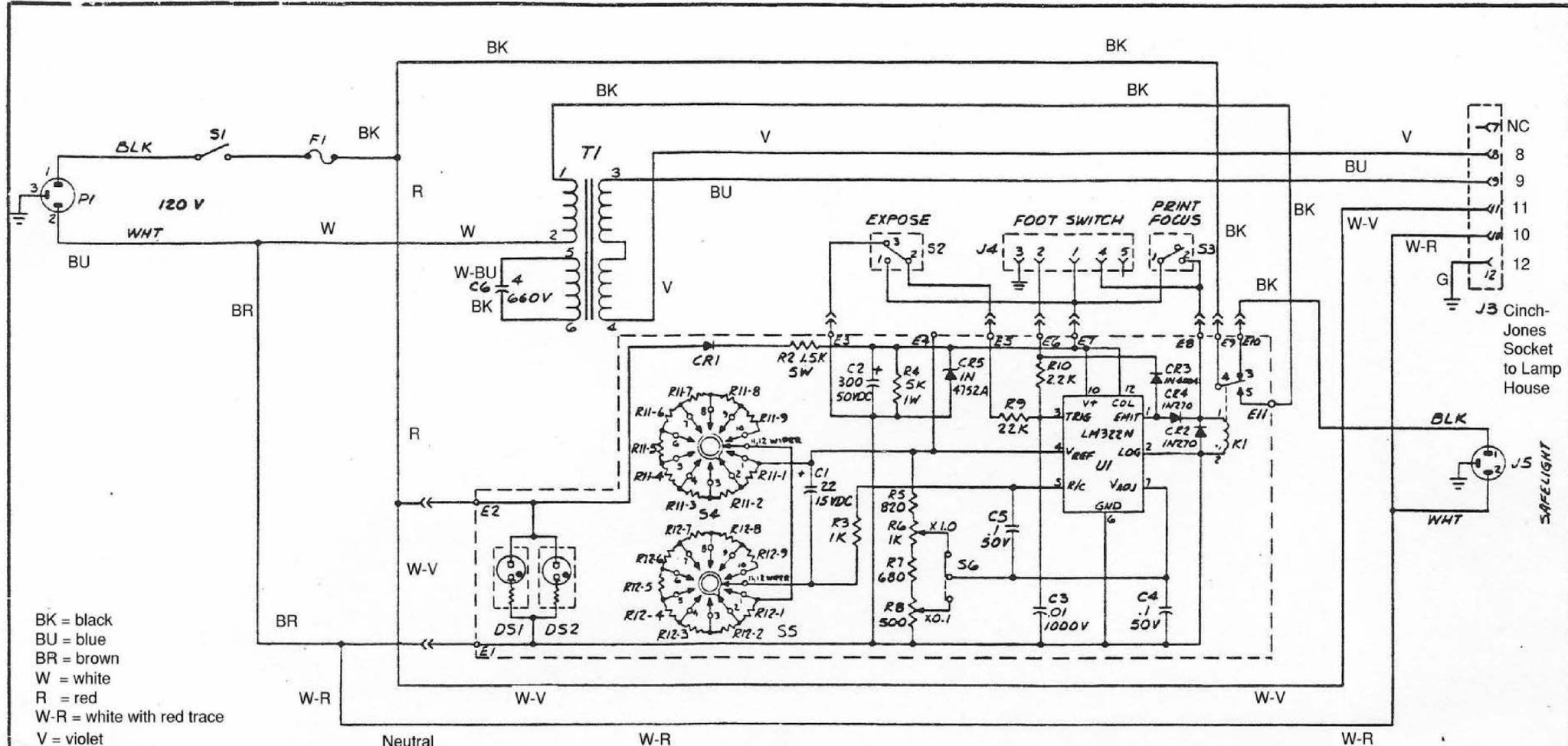
FOOT SWITCH FOOTNOTE

I need to add a footnote here because it doesn't fit anywhere else. I do not use footswitches or pedals on the D5-XL but I am sure many people do. Substituting an external timer will not prohibit that, but the external timer needs to be capable of pedal control also, if that's what you want. (The footswitches will no longer work when plugged into the back of the Chromegatrol.)

The Gra Lab turns on the main enlarger lamp while switching off the safelight (Focus), and also allows timed initiation until time-out (Expose). I think it could use pedal switches as well as panel switches.

I believe it would be easy enough to parallel the existing double pole double throw switch, to use an external footswitch with the external timer. Might need a relay. That is all Gra Lab specific, so it doesn't go here. So here are the numbered pins on the 461-058 plug which plugs into the Chromegatrol J4 footswitch jack on the back:

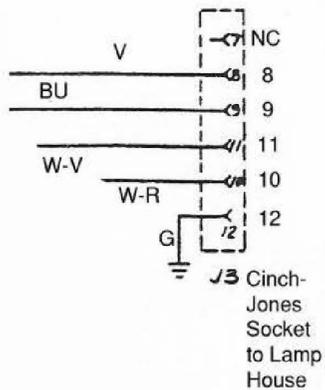
"Focus" switch connects pin 4 to pin 1; "Expose" switch connects pin 2 to pin 1. Doublecheck this and translate this pin information to whichever contacts your external timer needs, to be Focused or Exposed. (Only if you need to adapt the Omega footswitch for this external timer use.)



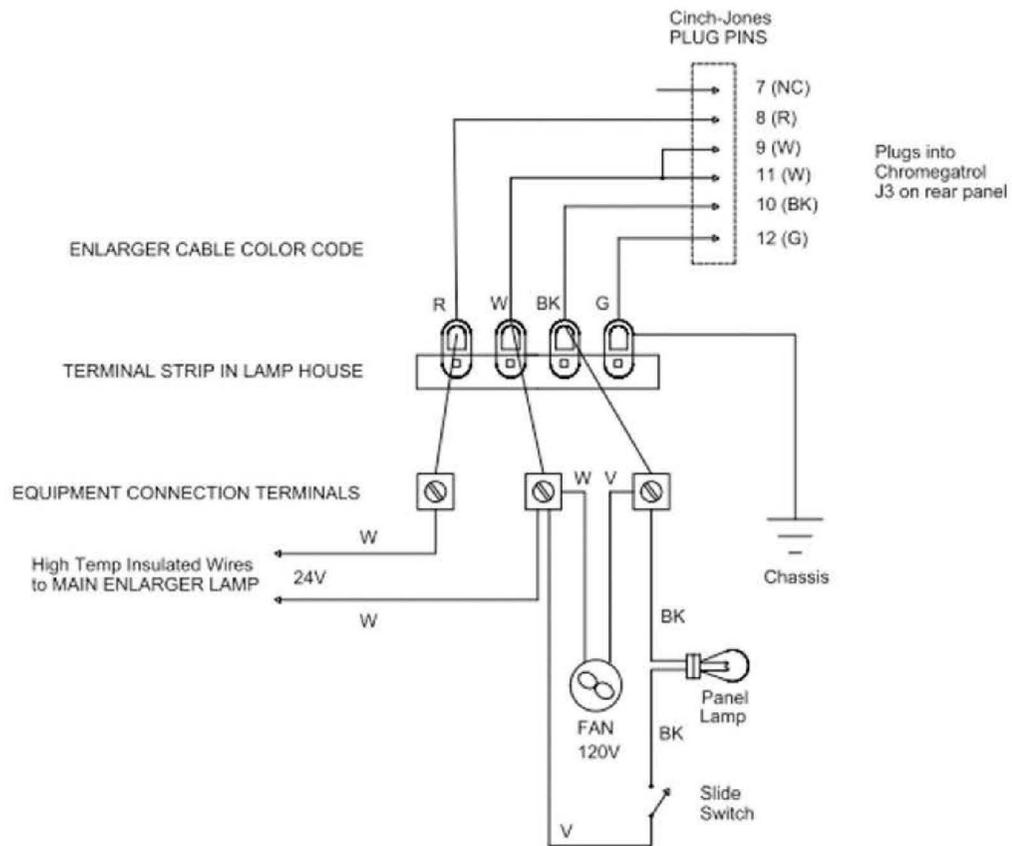
- BK = black
- BU = blue
- BR = brown
- W = white
- R = red
- W-R = white with red trace
- V = violet
- W-V = white with violet trace
- G = green
- NC = no connection

ALL RESISTORS ARE 1/4 W, 5% UNLESS OTHERWISE NOTED
 ALL CAPACITORS ARE IN MICROFARADS.

Schematic Diagram Cat. No. 412-040



BK = black
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ADDENDUM TO
Schematic Diagram Cat. No. 412-040
 to show socket, plug, cable,
 and lamphouse wiring