Ditchlights - Do We Need Them or Ditch Them?

by Craig W. Hartman

Over the past couple of months there have been several discussions as to the merits or viability of having ditchlights on our motorcars. Several of these discussions have been at meets with night running, and the latest on one of the internet forums discussing the reasoning behind the use of ditchlights, both pro and con. Let's take a look at what ditchlights in railway service are meant for, and then decide if this is what we are trying to imitate or use on our cars.

Originally, locomotives had a very weak headlight from burning kerosene in front of a large reflector to "light" the passage of the train, which gave way to burning acetylene gas in front of a similar reflector to intensify the light on some units. The light wasn't very strong, and did the best it could to allow the engineer to look down the tracks at what he was going to hit. With the evolution of electricity on trains, it wasn't long before the incandescent light bulb was outfitted to the locomotive. Increasing train speeds meant the need for increased illumination to see even further down the tracks to give increased reaction time and warning to "dump the air" if something amiss was observed in the beam of the headlight.

Collisions at grade crossings were common, so many methods were put in place to help alleviate the problem of train vs. vehicle or pedestrian, with the alternating ditchlight (in reality called a crossing light, but still referred to hereafter as ditchlight) being part of the "see and be seen" of safety. The high mounted headlight on a train does a great job illuminating down the track with its gazzillion candlepower, but close in to the train and at track level it does very little for the engineer's visibility, hence the ditchlight.

The ditchlight itself is mounted low on the locomotive, and shines at a level sweeping down along the track, giving illumination sorely needed for in close work. Also it gives a triangle of light that allows an observer easier judgement of distance to an approaching locomotive than just a single point of light . The alternating flash of the ditchlight was put on to again increase visibility of the oncoming train. The alternating ditchlights come on at the activation of the air horns, and stays on for approximately ten seconds after, with each blast resetting the timing circuit. `

Well, enough of the history. Maybe now you have thought about installing ditchlights, and would like to know how to proceed. Hopefully this will answer some questions, and possibly generate some more questions. I use ditchlights on my motorcars, and find them to be a helpful addition for night running, a backup for illumination should my main headlight fail, and an increased safety factor at grade crossings. I have set mine up as the locomotive style, with steady burn selectable, and alternating going into activation on sounding of the horns, air or electric, as well as pushbutton activation. The lights activate at a selectable board controlled rate, and then return to their previous steady state, either on or off. The lights are mounted low on the car, and afford an excellent view of the rail while on night ops, and give an excellent view of the front of the motorcar when in alternating mode. If you want to see the mounting on one of the cars, look at the front cover of the SETOFF of the Sep/Oct 2010 issue for a photo of our TMC2.

If you have decided to do some form of ditchlight, you must now decide steady burn only, flashing or alternating, or a combination of both as I use, the question being parts availability, money available and your level of expertise (or a friend's level of expertise!).

The simplest circuit if you select just one state of operation (steady or flashing), involves just a switch and the housings and bulbs with interconnecting wiring, and if alternating, an alternating flashing device wired in as well.

If you want to select between alternating or steady burn with no automatic functions, you will need a double pole, double throw center off heavy duty switch, as well as an alternating flasher, the aforementioned bulbs and housings and the attendant wiring.

Automatic functions require the use of a control module, two relays, a single pole on-off switch, device interface for activation (air brake switch, horn button(s), diode(s), and the housings and light bulbs.

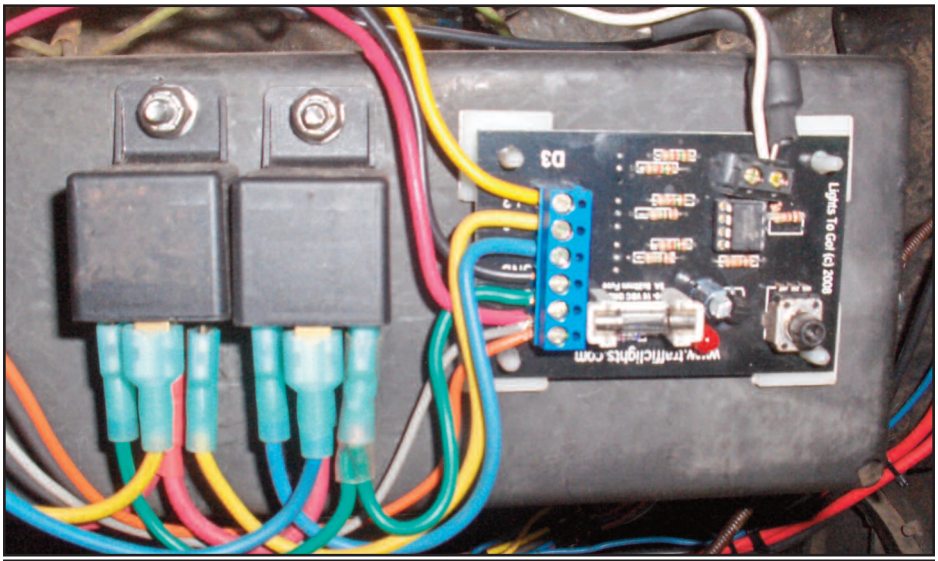
When selecting your light bulbs, more wattage is better, up to a point. Remember that the more wattage, the more amperage draw needed. If you do not have an alternator sized to handle the load, choose smaller wattage bulbs, or consider LED units as they draw minimal current. Most LED lights aren't really sufficient for illumination, but they are marginally effective for visibility when used in the alternating mode.

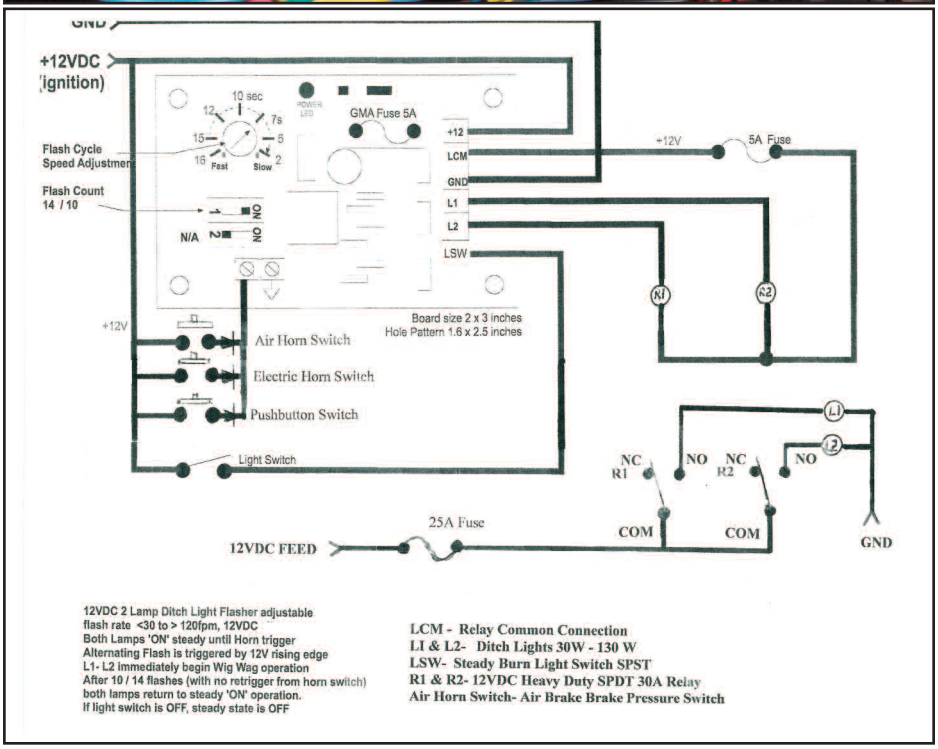
To figure your amperage draw use the formula **I=P/E (Amperage = Watts divided by Volts).** A fifty five watt halogen bulb pulls roughly five amps times two bulbs drawing almost nine amps, while a 130 watter (my favorite) draws a whopping 10.8 each, for a total of almost twenty two amps! Make sure you use adequate wire size to prevent voltage drop, fuse the circuit adequately to prevent fire, use heavy duty switches, and crimp or solder all connections. Make sure that the alternating flasher is sized adequately to handle the amperage/wattage of the lights it is to control as well.

Now that you have figured that you would like to go about putting ditchlights on your car, let's see how to do it.

If you have selected the simple circuit for selecting between alternating/steady burn, start by selecting and mounting your lights low on the front of the speeder, and run your wiring from each of these separately to the location for the switch you will be using. Mount your switch and your alternating

flasher. Flasher units used successfully have been Federal Signals FS1-1, NAPA flasher EL-13A-2, as well as several other units available fron police/fire safety suppliers. All of these units flash too fast for my preference, but do work. An adjustable flash unit is available from Lightstogo.com (unit D3) which works great, but it does require additional relays and wiring which I cover in the next circuit. Now run a power line from the fuse block, and hook it to both the input power on the flasher unit, and to two of the terminals of the switch as shown on the schematic (if you are using a DPDT center off switch it will be two of the end terminals together). Connect the output wires from the flasher, one each to the other end terminals on the switch, with the last two center terminals on the switch being connected to the wires coming from the ditch lights themselves. Tighten all connections, dress and fasten the wiring neatly, put the fuse in, turn on the switch to select the function, and voila - ditch lights!





Now for those of you who want the best of ditchlights and control, it gets a bit more complicated. The aforementioned wiring and basic steps still apply, so do those first. The flasher control unit I use is a proprietary unit made for me by LightsToGo,and has several selectable functions (flash count, rate of flash, trigger input), but uses an inverted output to what we normally use, and requires additional but easy additional relays and wiring. The unit has a trigger input to activate the alternating circuit, and a +12 volts applied here activates the module. Likewise a LSW input activates the lights for steady burn through another switch. Selecting input for activation can be made through many ways: air horn activation, electric horn activation, pushbutton activation, or a combination of the above. For air horn activation an air brake brake light switch is used, being screwed into a plumbing "T" in the line supplying the air to the horns so the air pressure activates the switch when the horn is sounded. For electric horns, simply picking up the output from the horn switch or relay to the horn is sufficient, likewise a pushbutton for manual activation. NOTE: when using multiple paralled inputs, diodes must be inserted in circuit to prevent simultaneous sounding of other electric devices on same circuit. Follow the schematic to hook up relays, switches and lighting circuits and you are ready to go. Tie all wiring back, dress neatly (the wiring, not you!) and give it a test. The flash rate in FPM is set by the upper left hand potentiometer, and works in conjunction with the DIP switch on the lower left to set how many cycles the lamps will flash before returning to a steady state. Setting the Light switch to "on" turns both lights on simultaneously, while leaving it off the lamps are dark. Activating one of the activation switches activates the wigwag feature, and after going thru the cycle, returns to the steady state that was in use. Activating the switch again before timeout resets the timer, and again goes though to end of cycle.

I hope this has been a help, and if you have any questions, feel free to e-mail me at hartindinc@aol.com, or call 973-838-3628 in the evening. See you on the rails, especially if you light up your ditchlights!!