

## INTRODUCTION

The following discusses what's new at Richmond Controls since the First Quarter 1999 Newsletter. Feel free to call me if you need additional information - Jim

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## NEW LOCOMOTIVES AND CARS

Note: I generally don't devote much space to discussing installations in HO Scale and larger locomotives, since installations in HO Scale and larger locomotives are so simple and straight forward (at least, when compared to N Scale). It is generally safe to assume that there is a Richmond Controls lighting module for any HO Scale locomotive or car, and for larger locomotives.

**ATLAS N SCALE SD60, SD60M, and SD50:** I have shipped a few kits including ditch lights for the SD60 and SD60M. The key is to use MicroTrains couplers, and attach the coupler with a 1mm x 4mm long screw, which is available from Northwest Shortlines. (A 00-90 screw is much too large.) This is the only way I've found to have enough room for a Sunrise Enterprises N-626A ditch light casting centered over a hole which does not interfere with the coupler. The EZ04-040S (\$36) will provide headlights and **ALTERNATING** ditch lights. The EZ13-040 (\$28) will provide headlights and **STEADY** ditch lights. The EZ11-020 (\$24) is used for headlights only, and the EZ04-021 (\$34) provides headlights and an amber rooftop beacon. In all cases, the board mounts to the inside of the body shell at the far rear end, and the board and all wiring remain with the shell when the shell is removed from the chassis. As usual, no chassis chopping is required.

I mentioned the possibility of doing porch mount ditch lights using "white" LEDs. At this time, the "white" LEDs which could be used have a strong blue tint and they look pretty goofy. We'll wait until white LEDs with less blue are available at a reasonable cost.

There's been a lot of interest in kits with dual headlights and dual Gyalights for D&RGW and KCS SD50s. The EZ04-040S can be set up to handle this (\$36.00), and there appears to be room in the nose without having to chop on the chassis. Sunrise Enterprises is probably going to do a proper nose headlight casting with holes for bulbs already in place -- #N611A.

**KATO RS2 & RSC2:** This locomotive has a single headlight at each end, and sufficient room in the long hood for any board in the EZ11 through EZ22 series without requiring any chassis chopping. Bezels are required. (Note that the clear plastic lens must be pushed out from *inside* the body shell.) Thus, the owner can have directional or non-directional headlights. No

special effects are possible without first removing metal from the chassis, but it is unlikely that anybody would want special effects. For **nondirectional** lighting, one can use the EZ12-120 (\$28.00), while for reversing directional lighting, it would be the EZ21-120 (\$32.00).

**LIFE-LIKE N SCALE GP20:** This locomotive comes with two small LED boards which plug into the chassis, like many earlier Kato and Atlas locomotives. For headlights only, use the EZ11-020 (\$24), and for headlights and an amber beacon, use the EZ01-021 (\$34). Ditch lights would be very difficult, for the same reasons mentioned regarding the SD60.

**KATO N SCALE DOME CAR:** There is a special version of the EZ41 for lighting the KATO Dome Car. The entire downstairs is lit, and the upstairs is left dark (as it should be). The price is \$34.00.

**CON-COR N SCALE BUDD CARS:** Lighting these cars is made difficult by the dark interiors, which absorb rather than reflect the light. (In a lighted car, the light you see is light reflected from the interior detail. When the interior is dark blue, virtually no light gets reflected.) For those willing to paint their interiors light tan or gray, the EZ51-00W (\$38.00, with wipers) fits in nicely. By the way, for those fussy people who like their cars to remain coupled together, the long Unimates have done the trick for me.

## NEW PRODUCTS

**BATTERY-POWERED FRED FLASHER:** We have been shipping the EZ25 Battery-Powered FRED flasher, and we made a shorter batch for Sunrise Enterprises. The shorter versions use a type N battery, which is about 2/3 the length of a AAA battery.

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## NEW PRODUCT PLANS

Showcase Miniatures is now selling their beautiful etched brass radio tower, and I've made tiny circuit boards for use in installing flashing red lights and strobe lights. I have prototype 20 foot containers from DeLuxe Innovations, which will be used to house the electronics. (I met someone at a train show who did transmitter installations in the real world, and he told me he likes to use surplus 20 foot refrigerated containers to house the transmitters, so we'll use the same idea.)

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## TRAIN SHOWS

Plans for the rest of the year include the N Scale Collectors' Convention in St. Louis in late June, NMRA in St. Paul in late July, the Santa Fe Modelers Convention in Denver in early August, the Richmond

Virginia GATS in mid-August, Houston GATS in late September, SP Historical Society in Northern California in late September, the Great Lakes Region Convention in Evansville in early October, the Ft. Worth show in November and the Oklahoma City show in early December. Come say Hi!

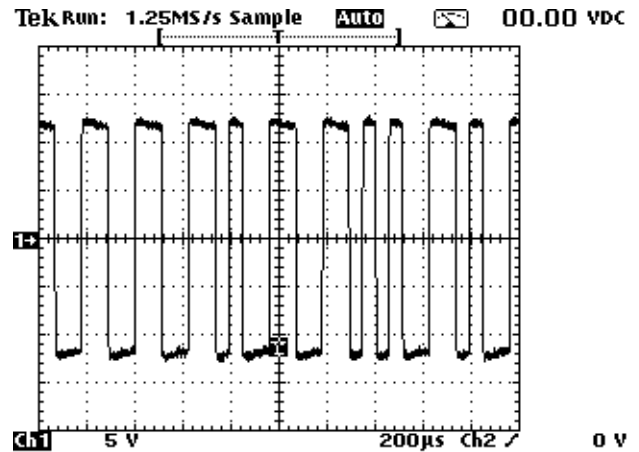
**OTHER:** In case you need to know, I only ship via USPS Priority Mail, which I find to be far superior to the costlier competitors in every way.

## TECHNICAL NOTE

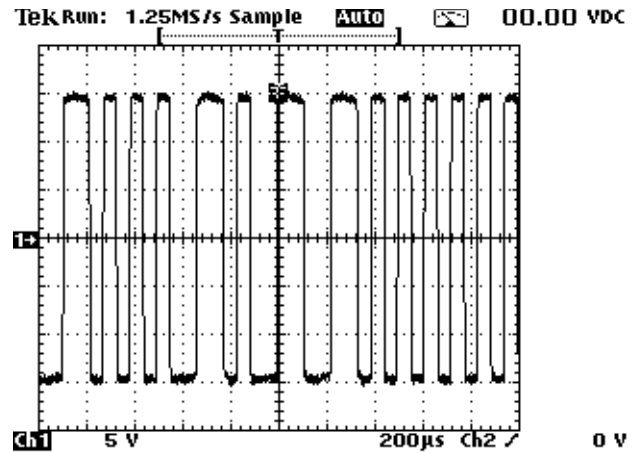
### DCC COMPATIBILITY OF EZ-LITE™ MODULES

If you look at the track voltage supplied by a Digitrax DCS100 using an oscilloscope, you'll see square waves of varying durations centered at zero volts, but jumping between some positive voltage and an equal but opposite negative voltage. The voltage amplitude is a function of the scale switch setting: 12 volts for N Scale, 15 volts for HO Scale, and 20 volts for G Scale. The duration of each pulse is typically either about 50 microseconds or 100 microseconds, and the pattern of the pulses is what carries the information to the decoder. Typical oscilloscope waveforms are included in the right column -- thanks to Marty Naul at TRAINSOURCE in Houston for assisting in acquiring the waveforms. As I mentioned in the last newsletter, EZ-LITE™ modules are perfectly compatible with DCC *as long as the 16 volt peak voltage specification is met!* Note that on the G Scale setting, the 16 volt specification is continually exceeded, and the 15 volt output for HO Scale comes pretty close. That's why we ask the EZ-LITE user to install a resistor (typically 620 ohms to 1000 ohms) in series with the module when operating on a DCC system. The resistor will cut the input voltage approximately in half. Thus an N Scaler expecting his module to see only 12 volts will be protected if somebody inadvertently throws the DCS100 switch to the G Scale setting. Since the EZ-LITE modules generally need no more than 4 volts for operation, the resistor imposes no limitations on the lighting circuit.

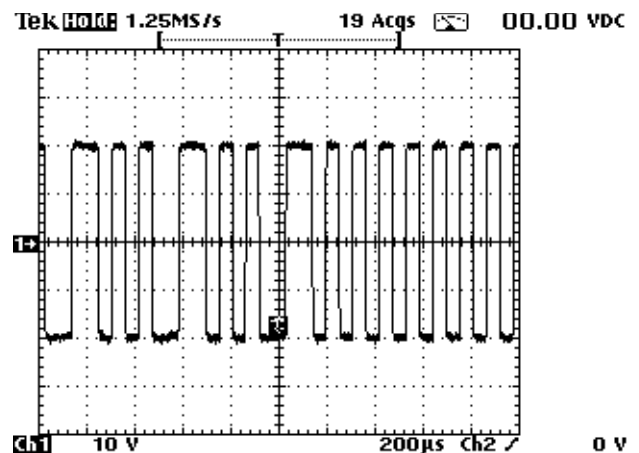
Waveforms in the next column were taken using a Tektronix THS720 storage oscilloscope with the probes connected across the rails, and with a Digitrax DCS100 supplying power to the rails. The three waveforms show 12 volt peaks for the N Scale setting, 15 volt peaks for the HO Scale setting, and 20 volt peaks for the G Scale setting.



N SCALE SETTING, 5 volts per division.



HO SCALE SETTING, 5 volts per division.



G SCALE SETTING, 10 volts per division.