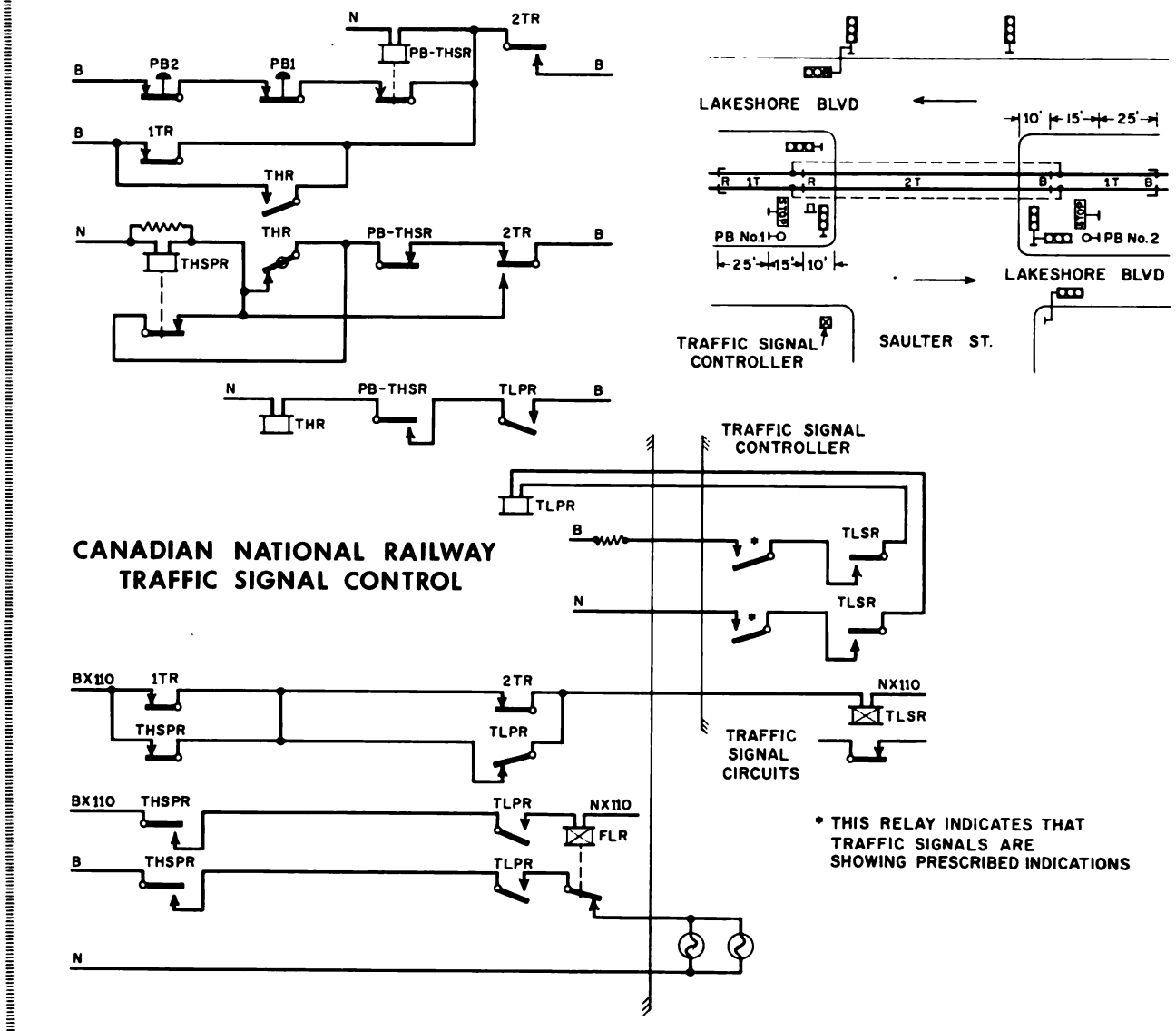


# KINKS

## Traffic Signal Control

*By A. D. Budd*
*Circuit Designer*
*Canadian National*

There are many protected grade crossing locations on slow speed tracks within yard limits on the Canadian National. Some have been equipped with standard flashing light signals to provide protection in lieu of flagging. At other locations due to the proximity of road intersection, it has been considered both feasible and expedient to control city traffic lights by means of pushbuttons operated by train crews. The latter facilitates flagging and expedites train movements over the crossing, particularly where the density of road traffic is such that it is hazardous for one flagman to control the vehicular traffic.

One installation of this type, which incorporates unusual circuitry features, has recently been installed at Saulter St., Toronto, and another is planned for completion later in the year. At both of these installations, train crews will be required to observe that a white light mounted on the instrument case is illuminated and flashing before movement on the crossing can be attempted. Should the move not be made within approximately 100 seconds of the light starting to flash, a thermal circuit will extinguish the light and return the traffic lights to automatic operation.

The relays that operate, or are operated by the traffic signals are the TLSR (traffic light operating relay), located in the traffic signal controller, and the TLPR (traffic light repeater), located in relay case. The TLSR is the relay which, when de-energized, removes the continuous cycling feature, cycles the traffic signals at both Saulter St. and Lakeshore Blvd. to red, and illuminates a green arrow which indicates "proceed" to through traffic on Lakeshore Blvd. These indications are maintained until the TLSR is re-energized. The TLPR repeats the TLSR de-energized and checks that the traffic lights have cycled to the indications described.

With track 1T occupied, depression of a pushbutton de-energizes the PB-THSR, which de-energizes the THSPR. This in turn removes energy from the TLSR circuit. The TLPR when energized, completes the flasher indication light and thermal relay circuits.

Occupancy of the center track, 2T, resets the PB-THSR and THSPR relays and de-energizes the flasher indication light and thermal circuit, but

insures that the TLSR remains de-energized. When 2T is vacated the TLSR is re-energized, restoring the traffic signals to automatic cycling operation and releasing the TLPR.

In case of an incomplete move (center track not occupied), the circuit operation is the same up to energizing the thermal circuit. On completing the heating time of the thermal relay the PB-THSR will be energized. On full thermal time, the THR check contact closes to re-energize the THSPR, which de-energizes the flasher and indication light circuits and re-energizes the TLSR. A further operation of the pushbutton will be required to again obtain the "proceed" indication light.

Certain features have been incorporated to prevent unwarranted interference with the traffic lights: the approach track relay 1TR must be de-energized before depression of the pushbutton becomes effective (this feature prevents operation caused by unauthorized use of the pushbutton). The THSPR is snubbed to prevent it releasing during the transfer time of 1TR (this prevents operation by holding the THSPR energized, should the center track be occupied without first operating the pushbutton).

These projects are being installed under the jurisdiction of D. H. Green, Signal Engineer—Great Lakes Region.

## Can You Answer These Questions?

- Where you have maintainers on duty 24 hours per day, do you assign units of signal and communications equipment to maintenance forces on a personal or section responsibility basis? (That is, is each piece of equipment assigned to one of the three men for routine preventive maintenance, or is all the equipment their joint responsibility, with a supervisor detailing which pieces of equipment are to be worked on each day?) Please give all details concerning your method of assigning such work, and your reasons for using that method.
- What use are you making, if any, of citizens' band radio?
- What department specifies and maintains the snow melters on your railroad? What kind of snow melters do you use? What maintenance program is followed?

**Please send us your answers to these questions. We pay for all answers when they are published. Answers will be published anonymously if requested. Write Editor, Railway Signaling and Communications, 30 Church St., New York 7, N. Y. Also please send us questions for this department.**

# WHAT'S THE ANSWER?

## Microwave Upkeep

**Q. What is your maintenance, test and repair procedure for microwave equipment? What type and make of test instruments do you use, and are they bench or portable models? Who does the test and repair work?**

**A.** Regular scheduled maintenance is done on microwave equipment daily, weekly, monthly and semi-yearly, depending upon the importance, the type of test and the rate of failure which would be expected. The majority of the daily and weekly tests consist of taking meter readings. The meters which are built into the equipment are connected to various test points via a multi-contact switch. The readings are recorded and compared with expected results. In this way the technician can detect any variations and predict when and where a fault is likely to occur.

Tests done monthly and semi-yearly consist of testing major units (amplifiers, discriminators, etc.). System tests are also included, i.e., test signal transmitter over repeater section to test circuit performance.

Approximately 20 different types of test equipment are used for microwave testing—voltmeters, oscilloscopes, power meters and a variety of signal generators. Test equipment is portable and movable test trolleys are used for transport. In some cases the equipment is rack mounted if its use is localized. Microwave technicians operate the microwave systems and do all the test and repair work.

*W. C. Wilkinson, Standards and Performance Engineer, Canadian National Telecommunications, Engineering Dept., Toronto, Ont.*

**A.** Our maintenance, test, and repair procedure for microwave systems can be divided into two parts, (a) microwave equipment proper and (b) "no-break" power supplies.

(a) Microwave equipment daily maintenance procedure: (1) meter readings on transmitters, receivers, and supervisory equipment; (2) tube checks, with replacement if necessary; (3) overall response measurements of transmitters and receivers on local basis; (4) overall system line-up, with adjustments as required. Other tests are carried out weekly and monthly on an overall system basis.

(b) "No-break" power supplies: Daily voltage and current readings and control settings. Daily inspection and routine maintenance of mechanical parts. Certain monthly tests as specified. An annual overhaul and interim inspection as well as emergency repairs to the diesel units are performed by an outside contractor.

Maintenance, testing and repairs to microwave equipment is performed by scheduled employees in a special classification of "microwave attendant."

A list of test instruments used follows:

**Portable:** 74801 SHF power measuring set; 74807 SHF oscillator; 74804 crystal calibrator; 74608 milliwatt test set; 74813A frequency changer; 5LXU1A PV meter; 439LXU8A wave guide attenuator; 439LTA952 wave guide filter; 175LTU2 crystal comparator; 38LXU8B attenuator; 33LTA test probe; 387LTA8A test probe; 387LTA16A test probe; 33/4543/Z96 test probe; 439LTA25A wave guide switch unit; 439LXU6 thermistor mount; 74144 transmission test trolley (including two scopes—square wave generator; sending and receive units for sync and picture, etc.); 251LXU-989 group microwave remote control test set (all STC); Marconi TF 995A signal generator; Marconi TF 899 millivolt meter; AVO tube checker; Heathkit 0-12 oscilloscope; RCA type 587 meter; Triplett 630 multimeter; RCA MI-34017 item 2 crossover filter; Ernest Turner meter 0-4 kv; Ernest Turner meter 0-12 kv; Pye Scalamp galvo; Telechrome video signal generator 1003C; STC 439LTA five wave guide crystal mount; Telechrome test signal receiver model 1004B; Tektronix 524 AD oscilloscope.

**Rack Mounted:** 74540 receiving unit; 74539 transmitting measuring set; 74519 frequency checking unit; 74515 video oscillator; 74612A attenuator; 437LXU1B frequency panel (all STC).

*G. H. Pescud, General Manager Communications, Canadian Pacific, Montreal, Que.*