A. **Purpose**

This Manual Part recommends vital circuit design guidelines for flashing light and gate control applications for grade crossing warning devices.

B. **General**

1. The vital circuit design guidelines provided in this Manual Part shall also apply to equivalent vital electronic and/or software applications.

2. The vital circuit design guidelines provided in this Manual Part represent one method of design for flashing light and gate control applications. Some aspects of the circuit design may vary depending on the design practices of the individual railroad.

C. **Circuit**

An example of a flashing light circuit with gate control is shown in Figure 163016-1. The circuit is activated by the crossing control relay (XR) being de-energized. This causes two events to occur. One, the gate repeater relay (GPR) is de-energized and, two, because of the delayed release of the crossing control repeater relay (XPR), it shall be de-energized after the relay snub time has elapsed. When the GPR is de-energized it shall place operating battery on the flasher relay (EOR) and lights. When the EOR becomes active it shall cause the lights to alternately flash. The gates shall descend when the XPR front contacts open, removing battery from the gate hold-clear circuit.

When the XR is energized, the XPR is also energized, causing operating battery to be placed on the gate control circuit. This causes the gate motor to operate raising the gates. Because the GPR is in series with the gate position (GP) contacts, the GPR shall not energize until the gates reach a near vertical position. When the GPR is energized, operating energy is removed from the flashing lights.

*The circuit wiring for the gate control circuit can be 3 wire, as shown in Figure 163016-1; or 4 wire as shown in Figure 163016-2.*

*Add HD contacts on EOR (8 places), N connection to each gate mechanism just above the lowest B connection, delete Figure 163016-2*
Figure 163016-1 Example of a Flashing Light Circuit with Gate Control—3-Wire
The following Figure 163016-2 to be removed:

Figure 163016-2 Example of a Flashing Light Circuit with Gate Control - 4 Wire