A. Purpose

1. This Manual Part recommends vital circuit guidelines for interconnection circuits for adjacent tracks where it is required to have independent controls operate the grade crossing warning devices as a single system.

B. General

1. Control circuit interconnection between adjacent tracks may be required when an insufficient distance exists between same railroad or foreign railroad tracks to warrant independent warning devices.

2. Examples of adjacent track interconnection circuits are shown in Figure 163011-1, Figure 163011-2 and Figure 163011-3. The warning devices will operate for train occupancy on either track.

Some aspects of the circuit designs may vary depending on the design practices of the individual railroad. The interconnection shall be through the use of vital relays, vital inputs or outputs of solid state controllers, or vital communications protocol, such as the Spec. S-5800-05 – Communications System Architecture, AAR Railway Electronics Manual, Section K-II, 2005 (formerly ATCS Spec. 200), or a combination thereof.

3. In addition to the standard crossing control interconnection items, consideration may be given to the following:
   a. Gate-down indications for monitoring purposes.
   b. Advance preemption functions.
   c. Gate-down indications for Advance Preemption.
   d. Second train logic.
   e. Local and/or remote indications for maintenance support.
   f. Control equipment health status.
   g. Battery isolation for foreign railroad interconnection circuits, to prevent grounds.


C. Operation

1. Gate Application Solid State Controller Logic

   An example of an adjacent track interconnection, using a solid state crossing controller for each track, is shown in Figure 163011-1.

   When a train approaches the crossing on track "B", the XR relay for track "B" is de-energized, which de-energizes the crossing control relay repeater (B-XR) in the track "A" case. The de-energized B-XR removes energy to the solid-state crossing controller input (IN).

   The GPR relay for track "B" is de-energized when the gate for track "B" is not vertical, which de-energizes the gate position relay repeater (B-GPR) in the track "A" case. The de-energized B-GPR removes energy to the solid state crossing controller gate position input (GATE UP). This will ensure that all lights continue to flash until both the "A" gate and the "B" gate are vertical.

   The circuit operation is functionally identical for both tracks.
Figure 163011-1: Example Adjacent Crossing Interconnection using Solid State Crossing Controller

Commented [JS1]: Modify figure to show 86- to 86 degrees for clarification.
2. Gate Application Relay Logic

An example of an adjacent track interconnection using relay logic is shown in Figure 163011-2.

When a train approaches the crossing on track "B", the XR relay for track "B" is de-energized, which de-energizes the crossing control relay repeater (B-XR) in the track "A" case. The de-energized B-XR removes energy to the XPR relay in the track "A" case.

The GPR relay for track "B" is de-energized when the gate for track "B" is not vertical, which de-energizes the gate position relay repeater (B-GPR) in the track "A" case. The de-energized B-GPR removes energy to the GPPR relay in the track "A" case. This will ensure that all lights continue to flash until both the "A" gate and the "B" gate are vertical.

The circuit operation is functionally identical for both tracks.
Figure 163011-2: Example Adjacent Crossing Interconnection using Relay Logic

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An example of an adjacent track interconnection with interior gates is shown in Figure 163011-3.

The interconnection circuits for this example are functionally identical to those shown in Figure 163011-1 or Figure 163011-2. Additional circuit elements are required within each case to support the operation of the interior gates.

Figure 163011-3: Example Adjacent Crossing Interconnection with Interior Gates