



CTC, Inc.

**Hardware Innovations in Interconnected
Highway-Rail Grade Crossings**



Interconnection circuits

- The interconnection is the electrical circuitry that connects the railroad equipment and the traffic signal controller to perform preemption.

Interconnection circuits

Barriers:

- Controller manufacturers and firmware developers differ.
- Lack of understanding the details of preemption operation
- No TxDOT standard to address interconnection circuits and operation

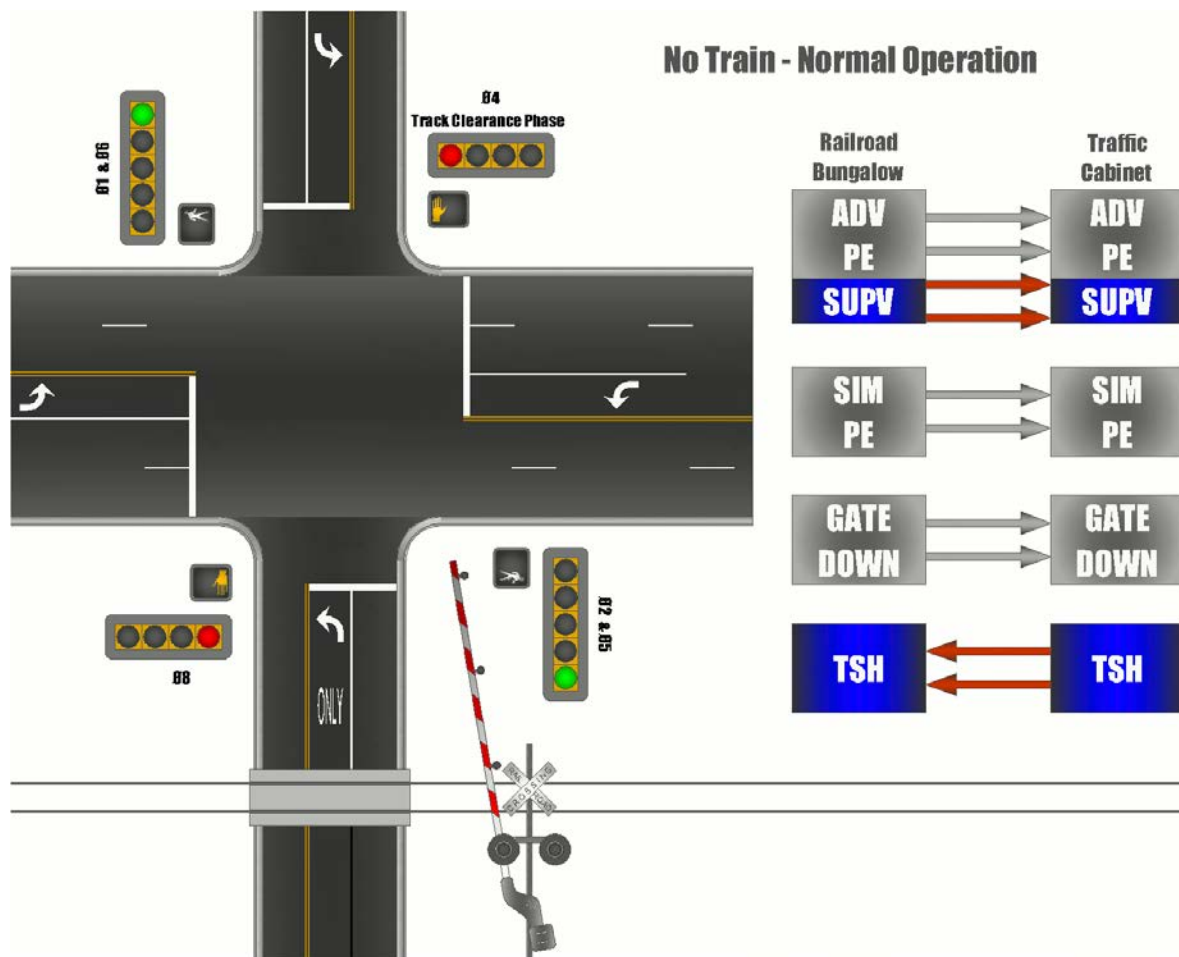


Interconnection circuits

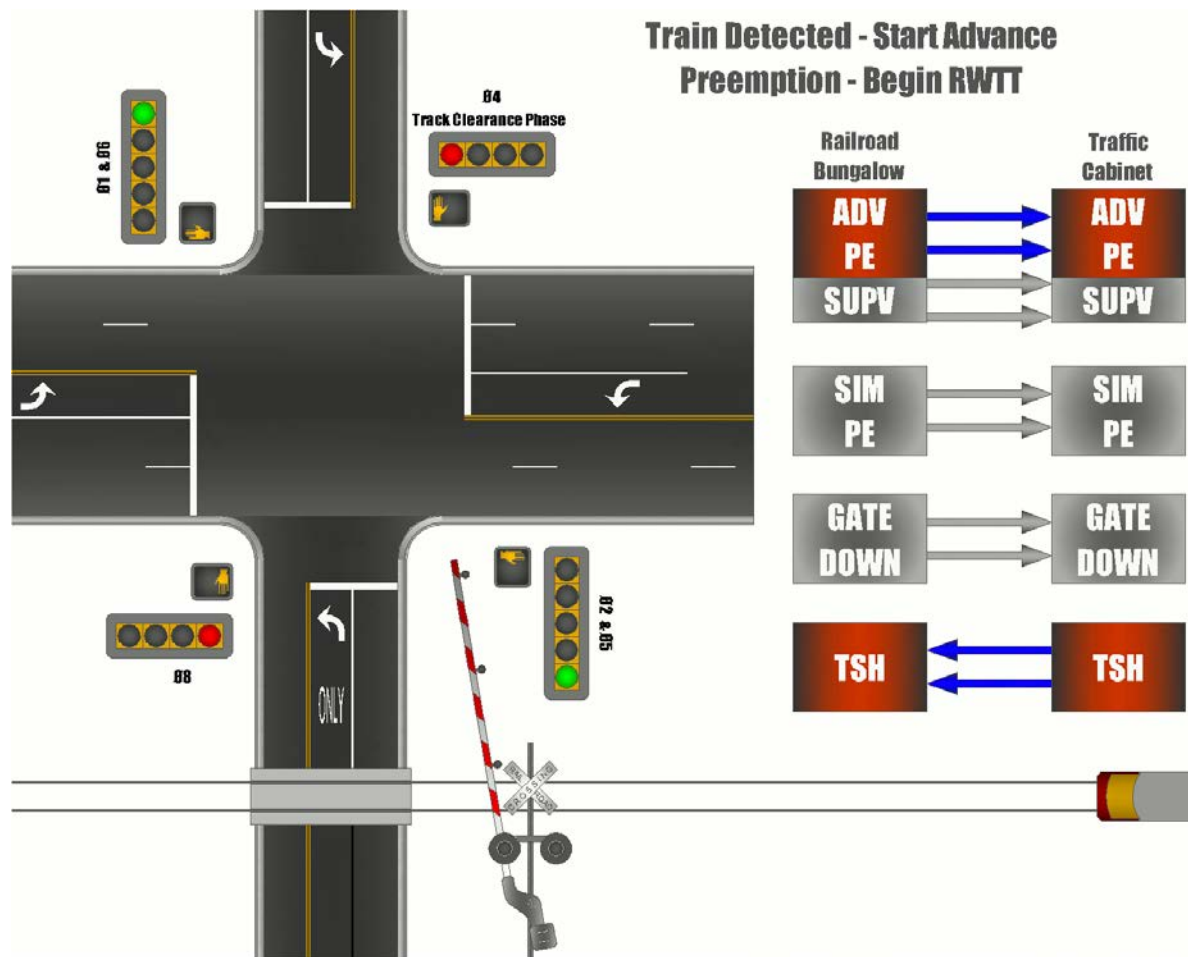
Circuits for the traffic signal interconnection design:

- Advanced preemption circuit
- Supervision circuit
- Simultaneous preemption circuit
- Gate down circuit
- Traffic signal health circuit
- Maximum preemption timer

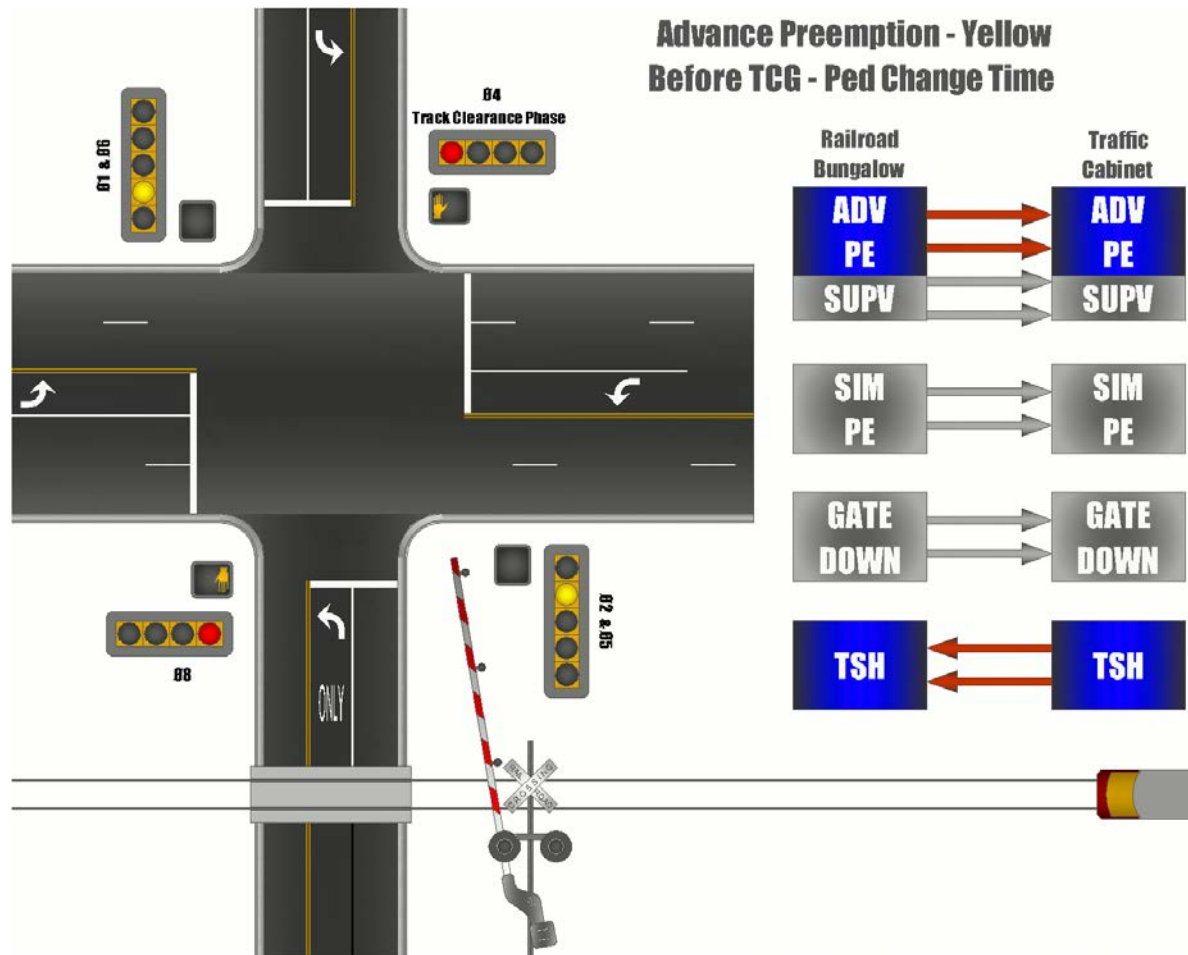
Preemption circuit operation



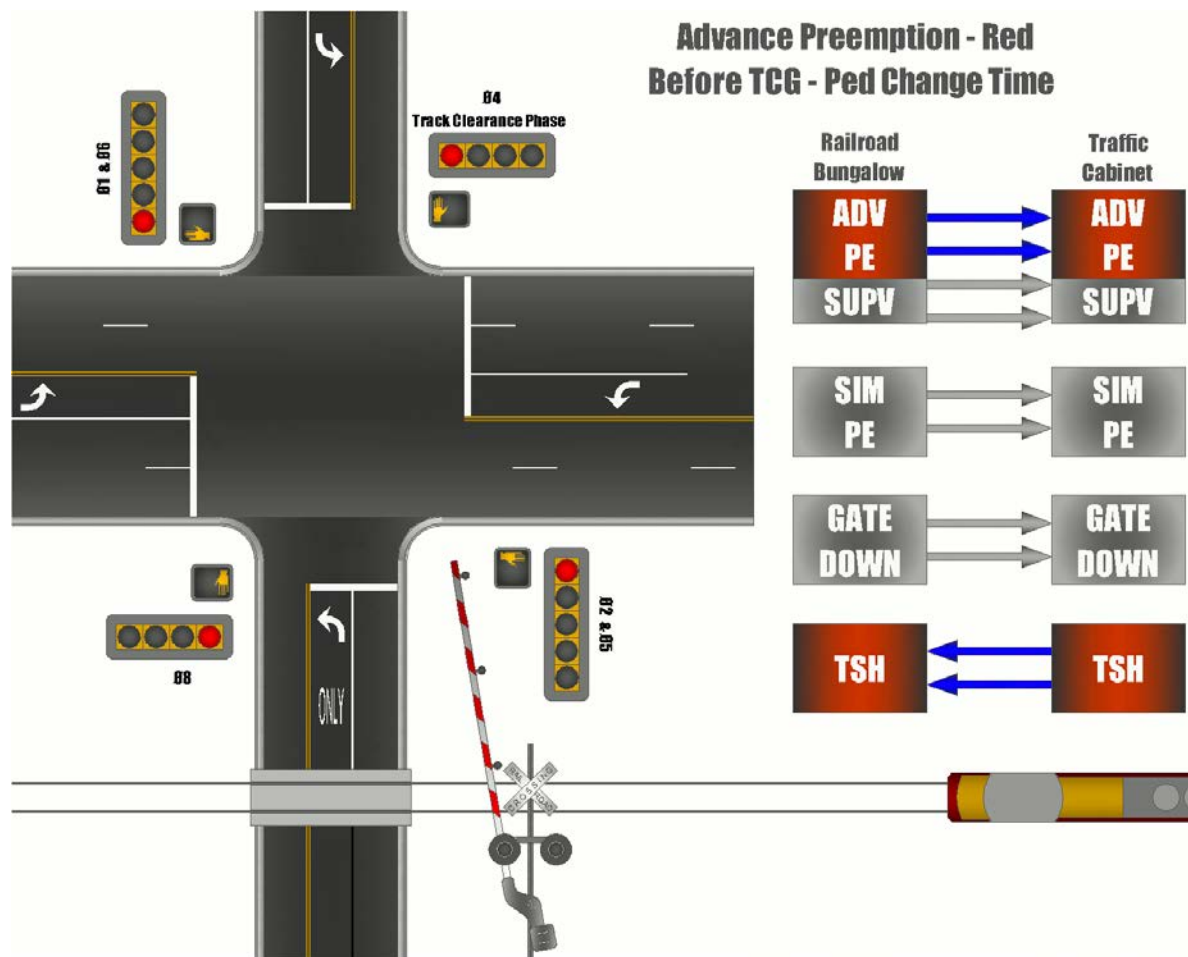
Preemption circuit operation



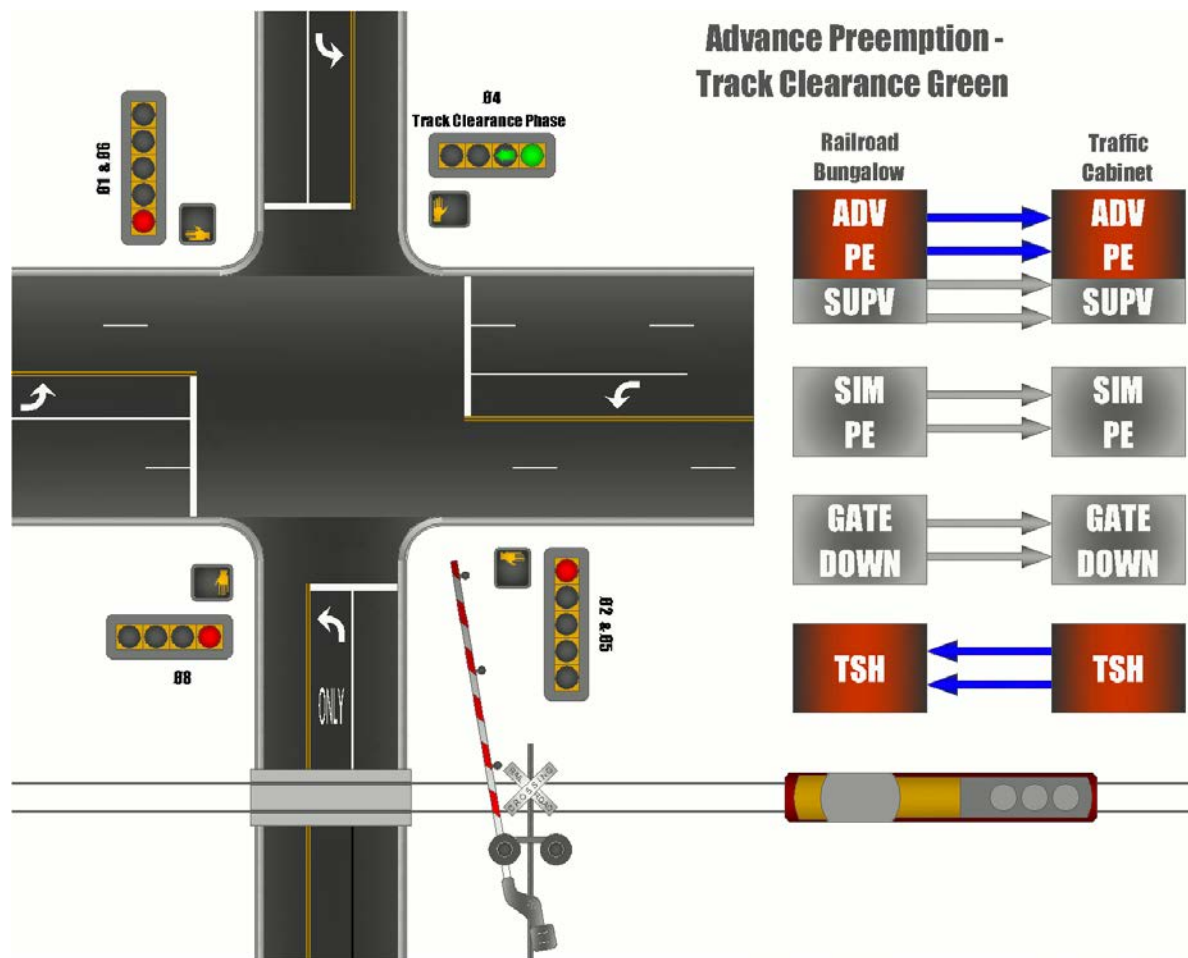
Preemption circuit operation



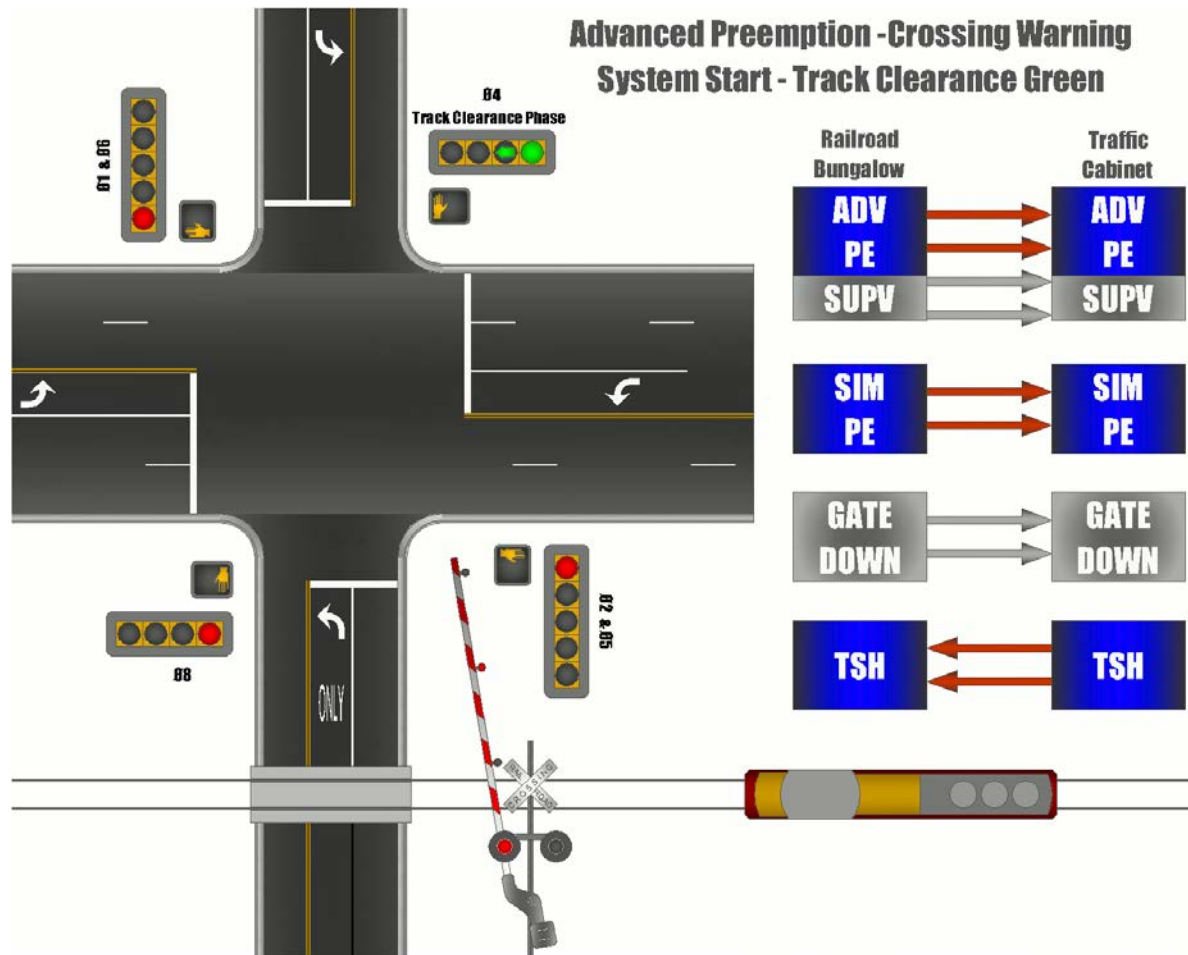
Correct preemption operation



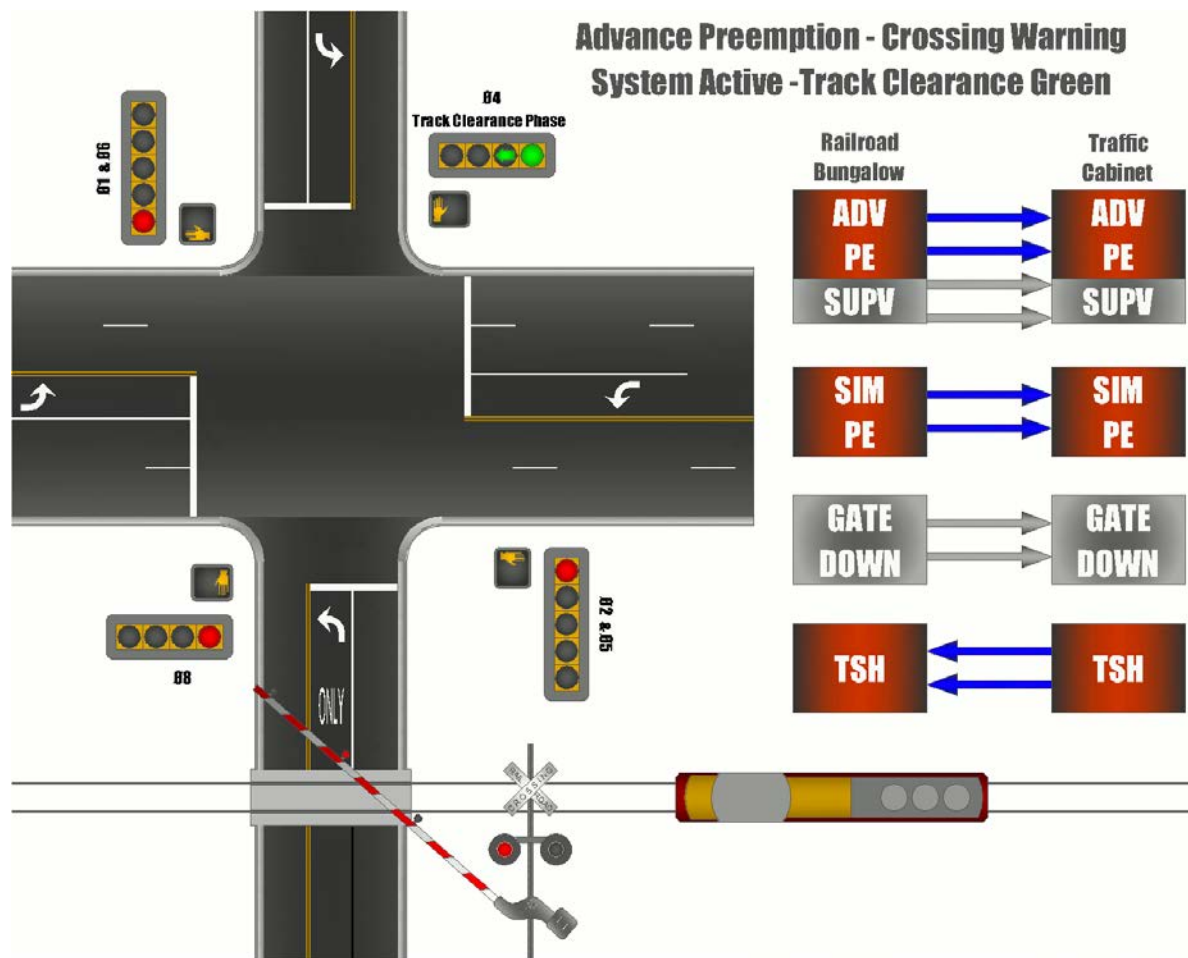
Correct preemption operation



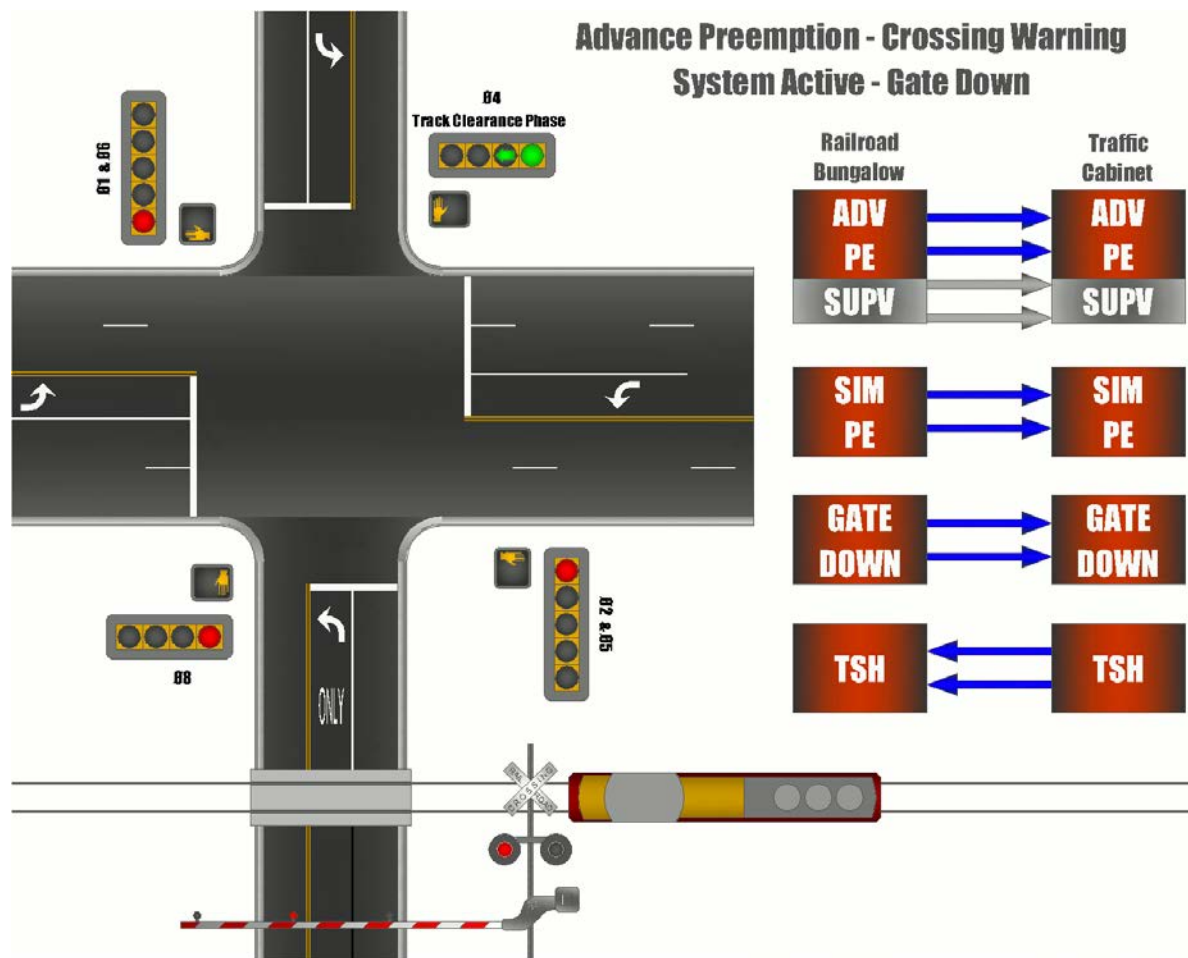
Benefits of preemption expertise



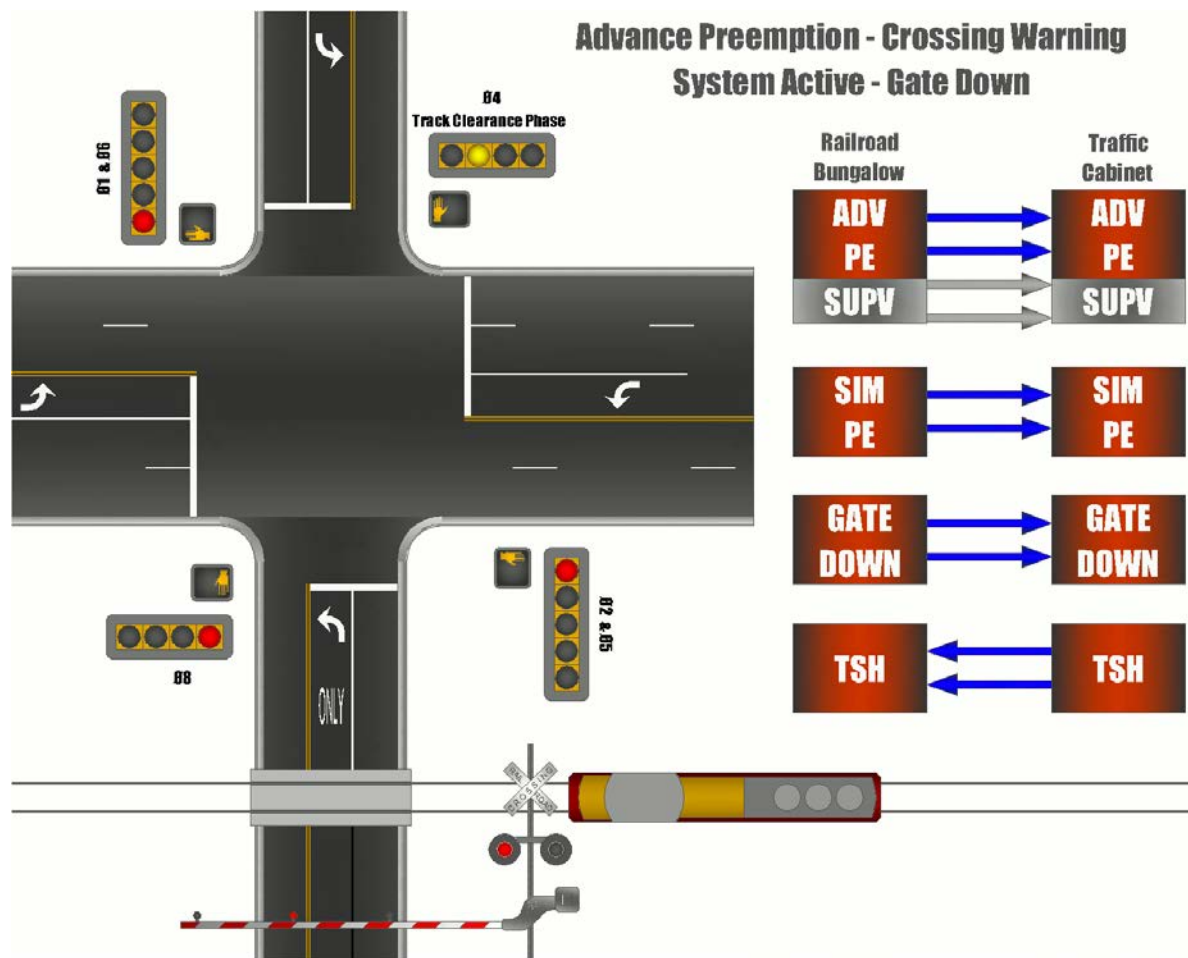
Preemption circuit operation



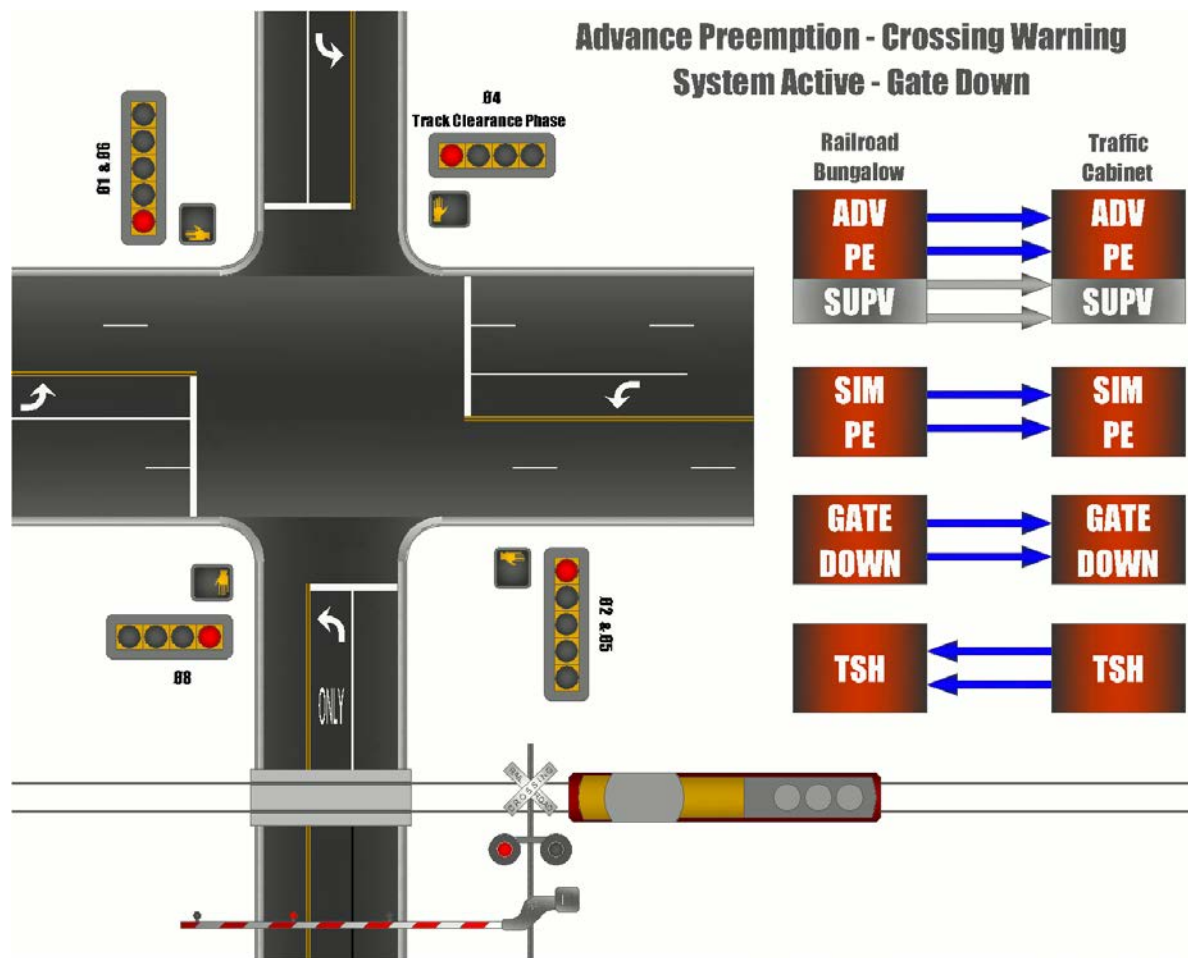
Preemption circuit operation



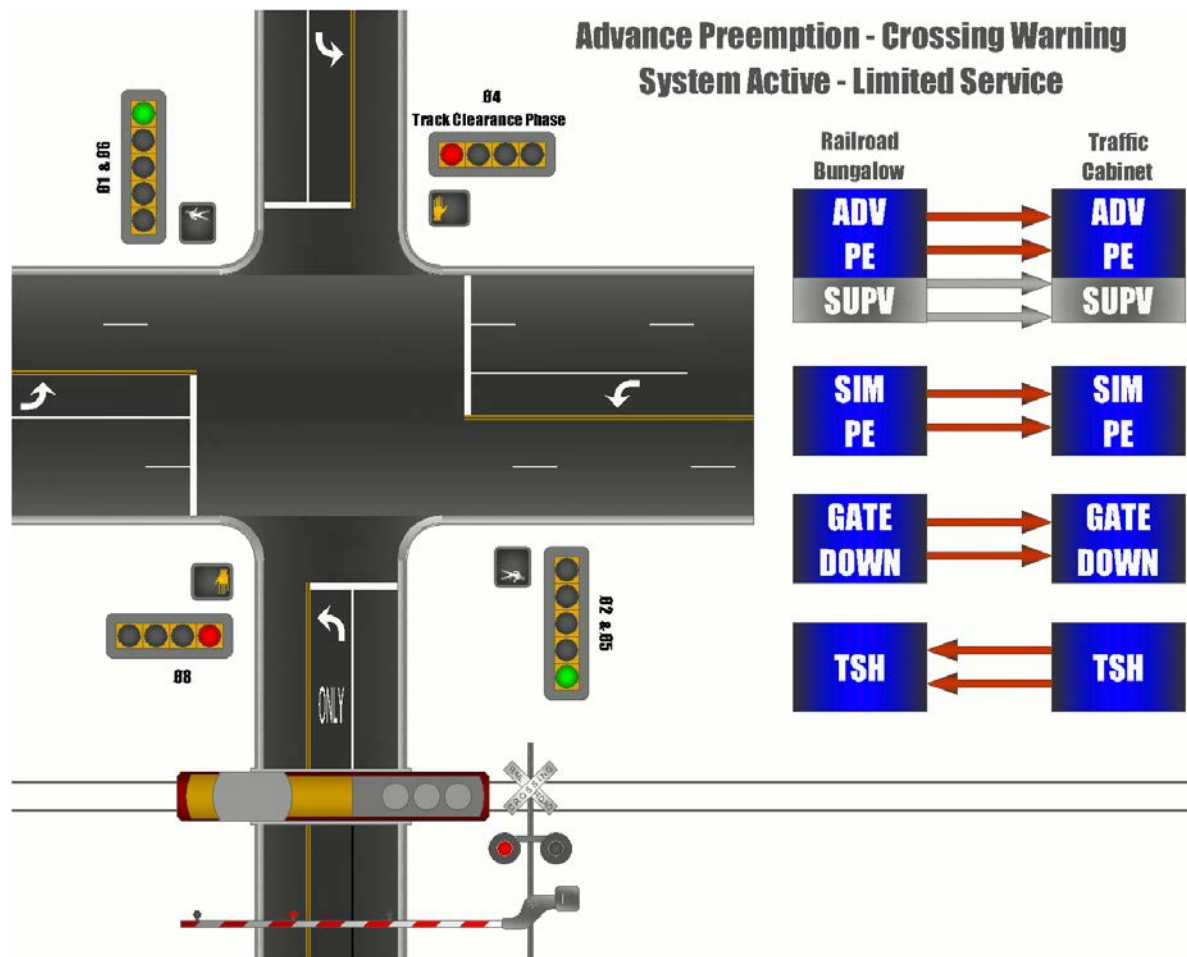
Preemption circuit operation



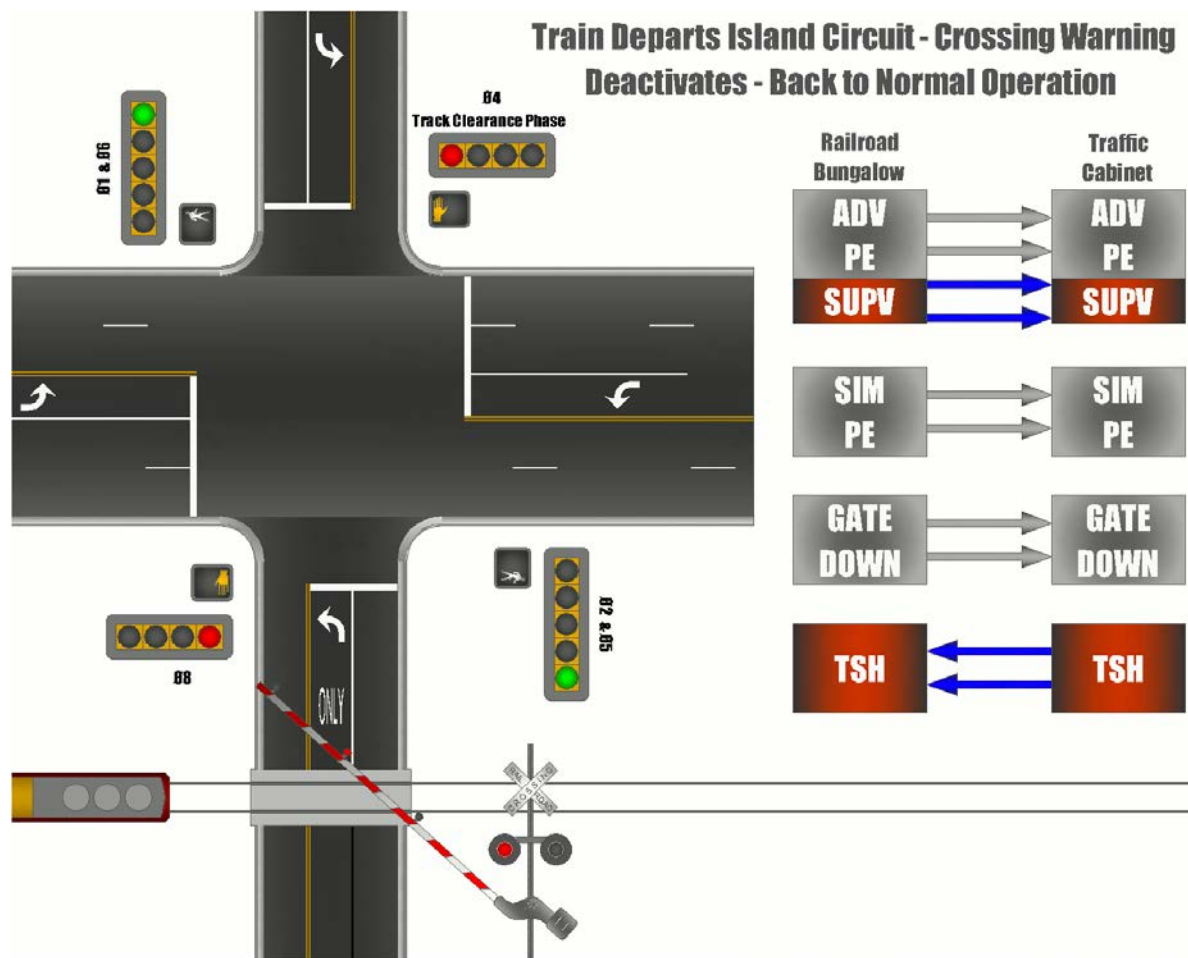
Preemption circuit operation



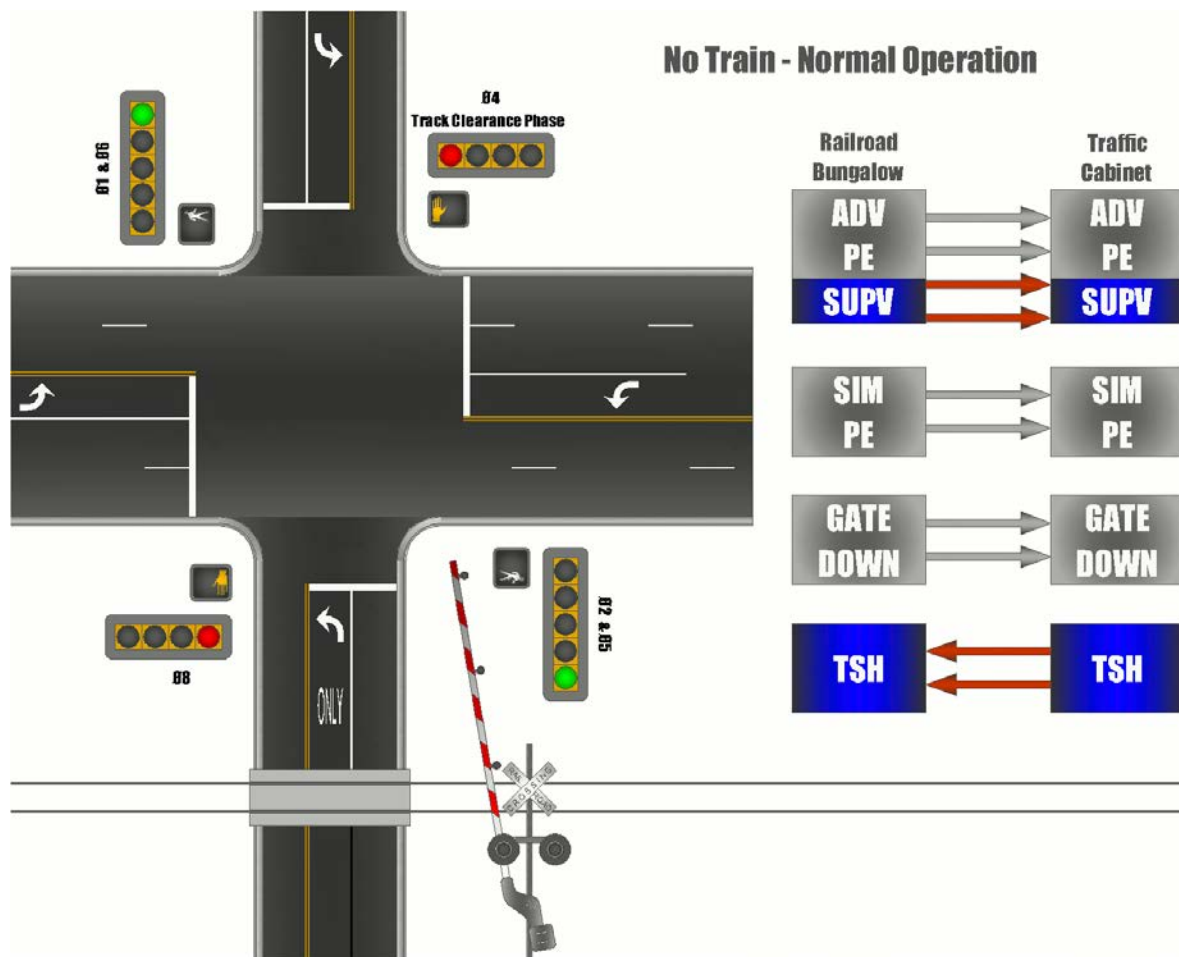
Preemption circuit operation



Preemption circuit operation



Preemption circuit operation



Interconnection circuits

Implementing the enhanced interconnection can become a challenge:

- Electrical requirements
- Terminal facilities
- Functional operation

CTC's highway products

Railroad Preemption Interface



- ✓ Notifies traffic signal controller of approaching train
- ✓ Safeguards railroad preemption sequence in the controller

CTC's highway products

Traffic Signal Health Expansion Card



- ✓ Coupled with CTC's Railroad Preemption Interface, provides additional safety layer to ensure preemption sequences at grade crossings operate as designed.

CTC's highway signal products

IGOR™ - next generation signal operations recorder system.

- ✓ The only recorder with video capability.



CTC services and products

- Highway-rail expertise
- Highway-signal products
- Preemption inspection
- Quiet-zone engineering
- Railroad-signal engineering
- Crossing-signal construction

CTC contact

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