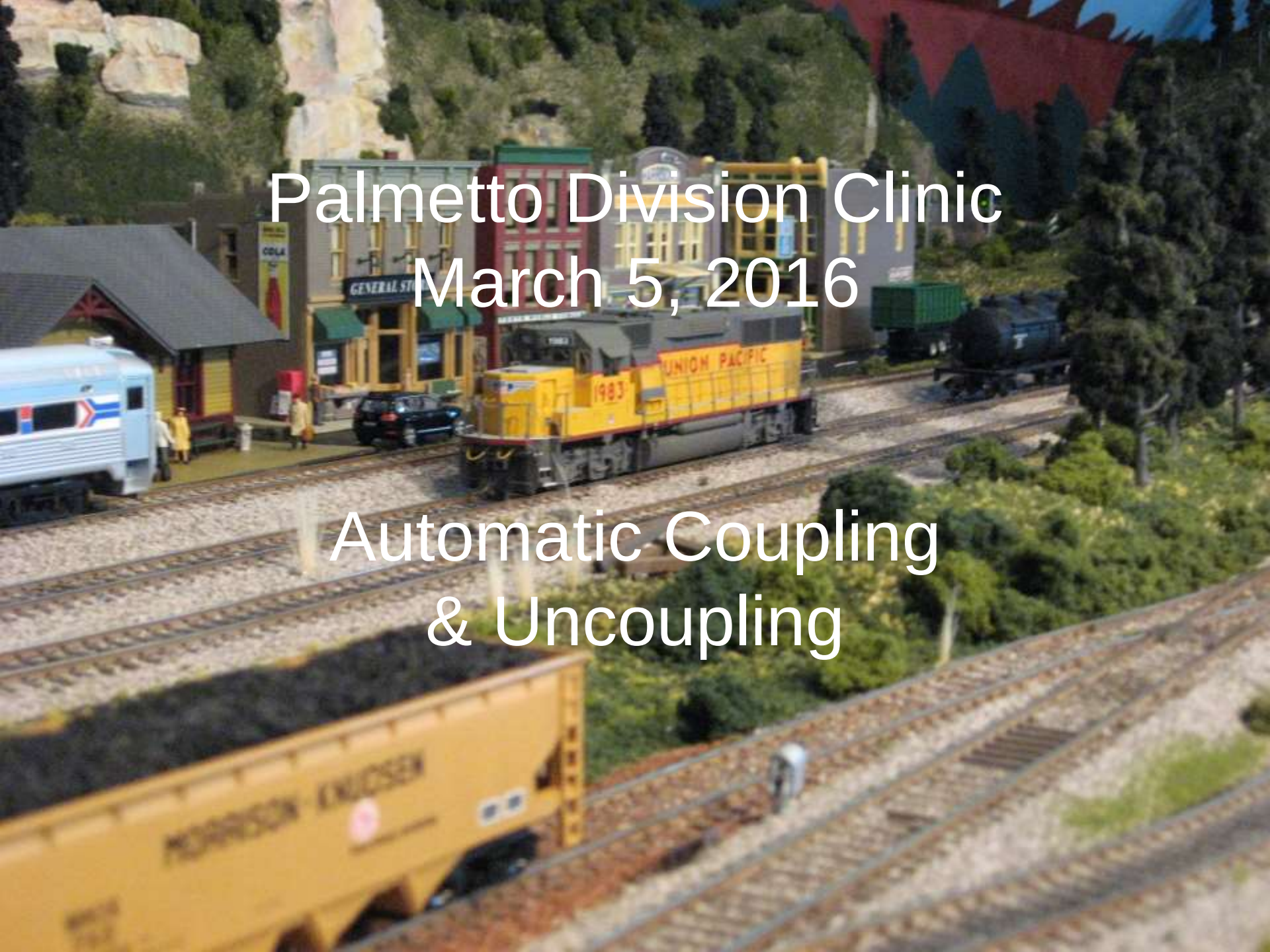


Palmetto Division Clinic
March 5, 2016

Automatic Coupling & Uncoupling

Topics

- Model railroad couplers in general
  - McHenry, Accumate, Kadee, etc.
- Coupler operations
  - Manual
  - Automatic
  - Electrical
  - DCC
- Software control
  - Rolling stock detection
  - Steps to automate coupling & uncoupling

Couplers – Summary of Brands

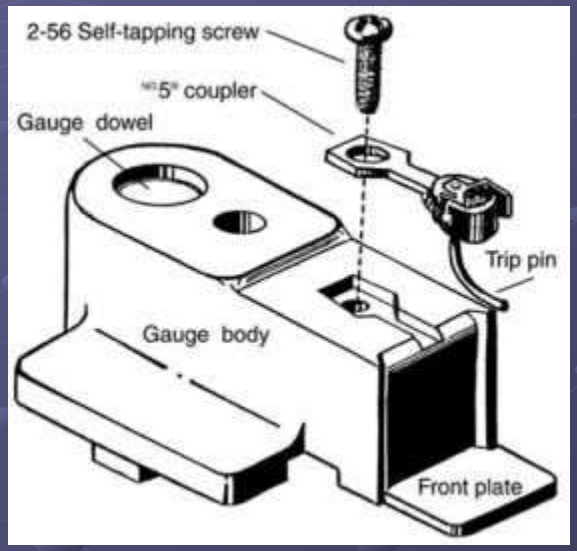
Accumate	Included in all new car kits Not fully compatible with Kadee Knuckle doesn't always operate freely Plastic knuckle spring Maybe okay in unit train service
Athearn	Athearn's proprietary horn-hook coupler Released knuckle couplers around 2001 Compatible with Kadee
E-Z Mate	Bachman's offering Standard on all Spectrum models Plastic knuckle spring has a memory Considered an off brand coupler
Intermountain	Included on all late model products Mate up well with Kadee Primarily nylon Appearance same as Kadee #5
Kadee	Started over 30 years ago First introduced the AAR Janney type Slightly larger than scale prototype Ultra reliable – accepted defacto standard
McHenry	Included on all Life-Like equipment Looks like Intermountain Knuckle spring prone to memory Centering spring a Kadee clone

The Kadee Coupler

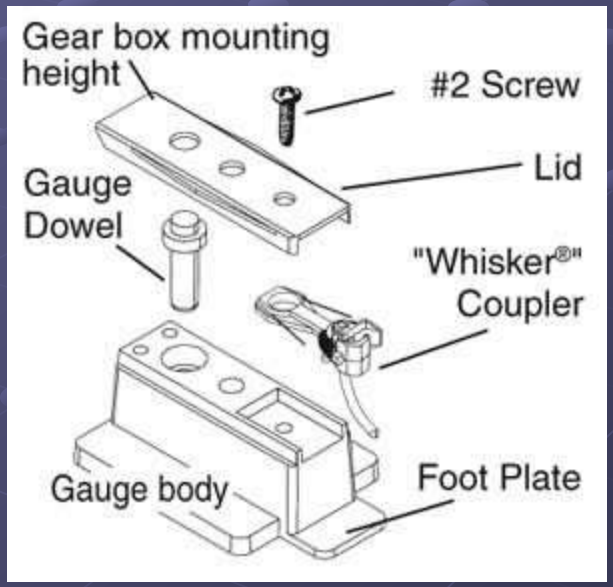
Standard Kadee Magne-Matic © Coupler

Tools

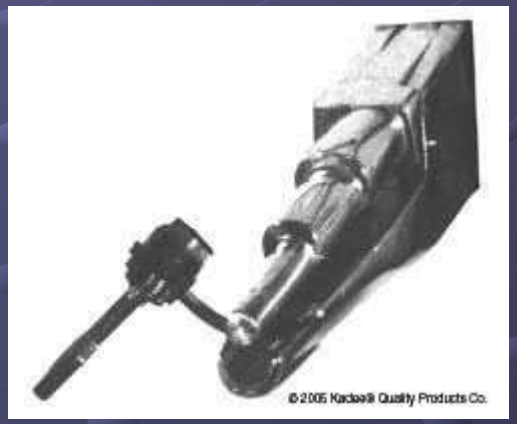
#205 Coupler Height Gauge



#206 Multi-Purpose Coupler Height Gauge



#237 Coupler Trip Pin Pliers



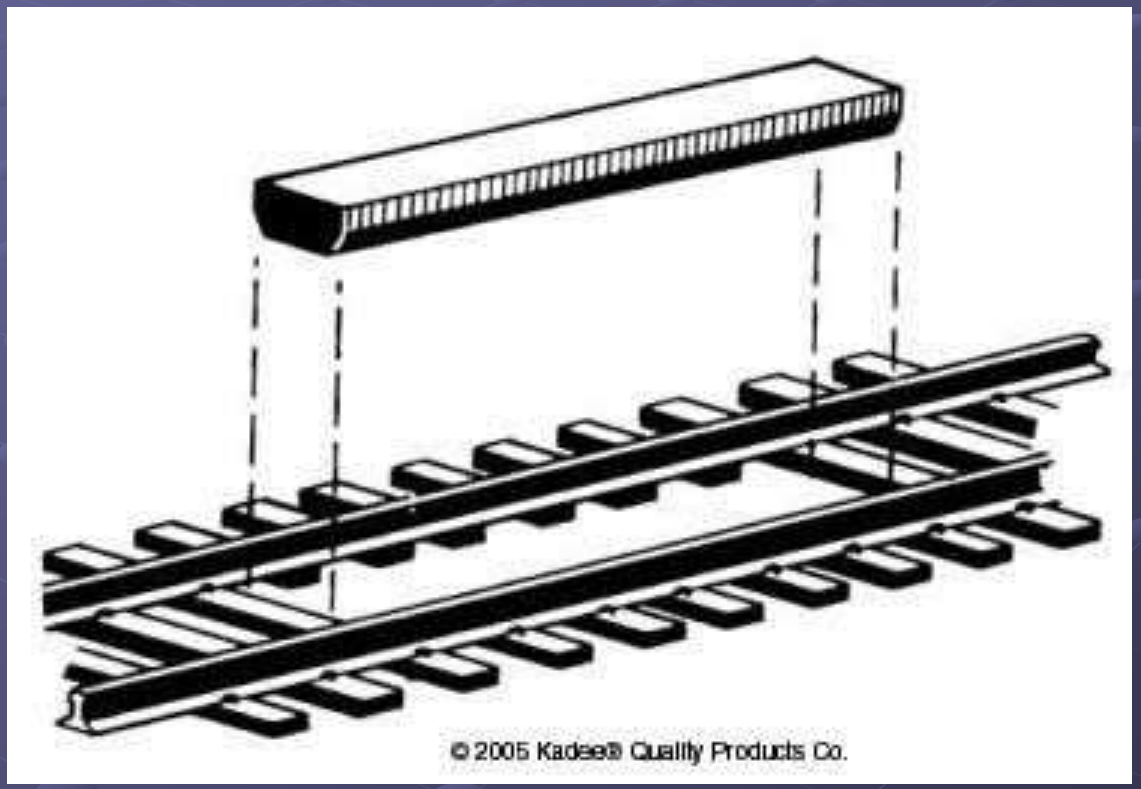
Coupler Operations

Manual Uncoupling

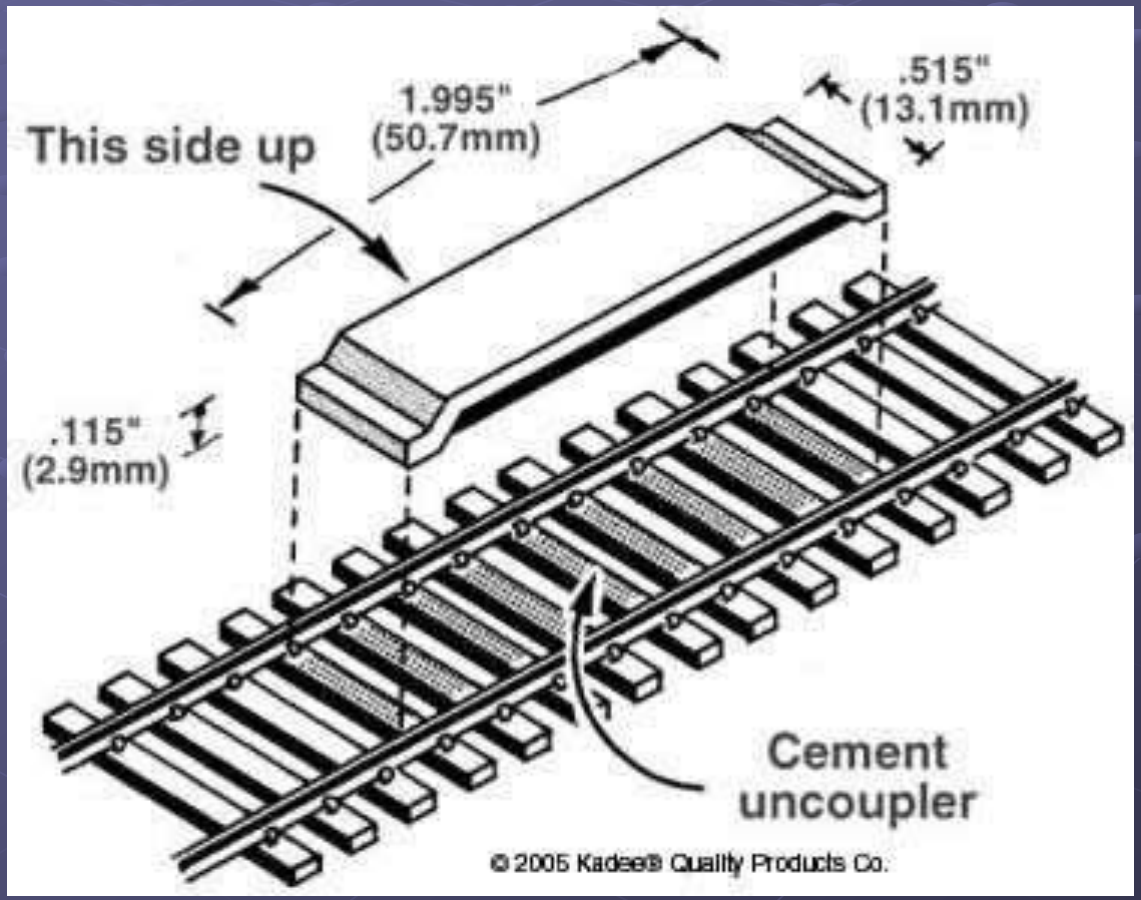
Automatic Uncoupling

- Kadee Magne-Matic © Uncouplers
  - Between the rails non delayed, #312
  - Between the rails delayed, #321
  - Under track delayed, #308

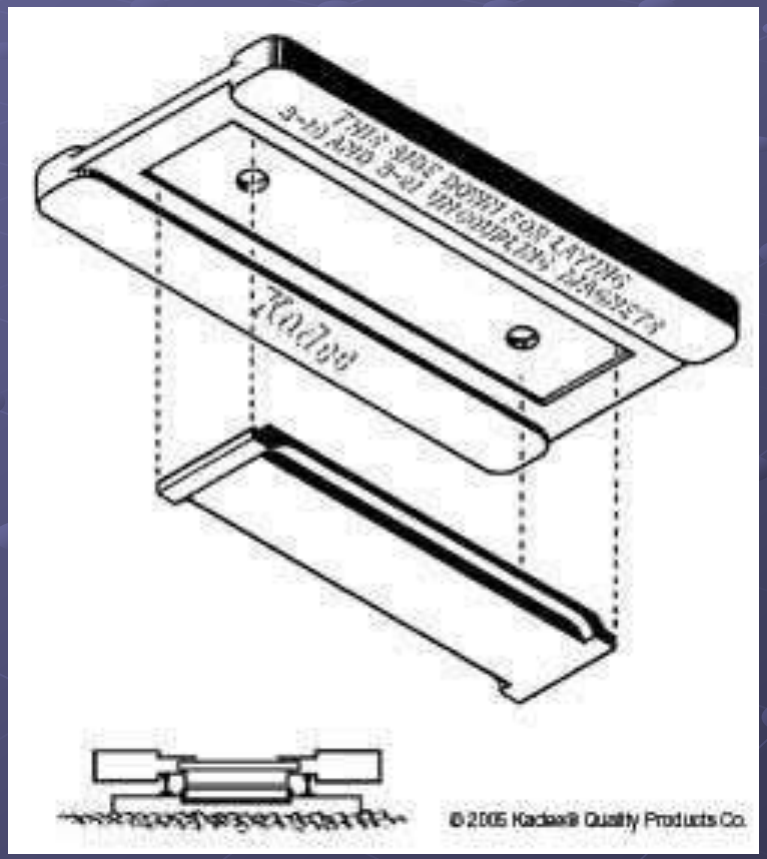
#312 Non-Delayed Between the Rails Uncoupler



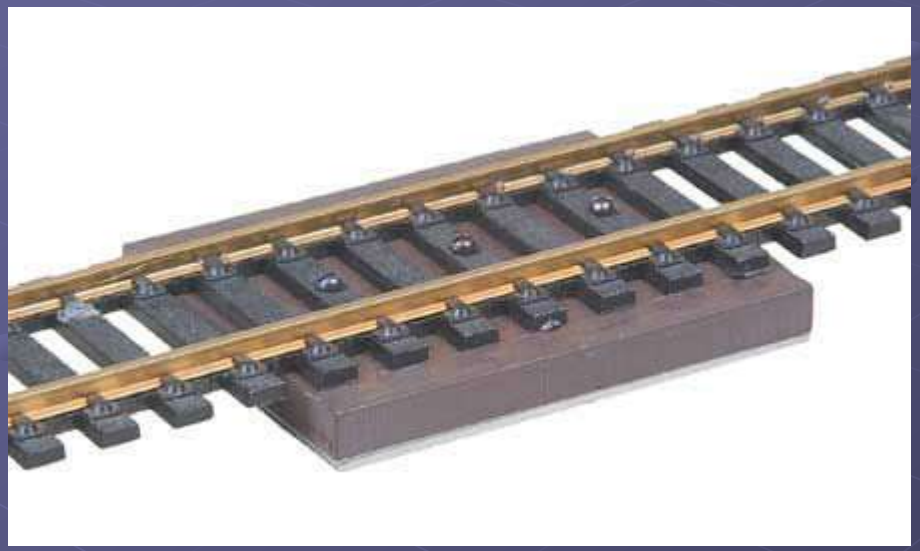
#321 Delayed Between the Rails Uncoupler

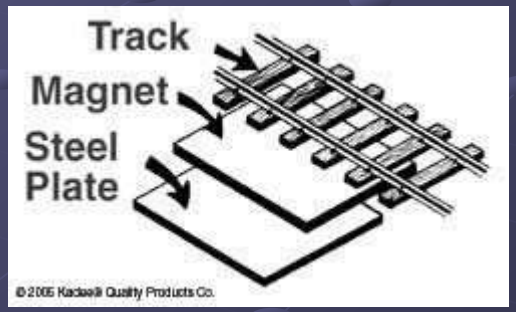


#334 Uncoupler Gluing Jig



#308 Delayed Under the Track Uncoupler





How They Work

1. Stop with the couplers over an uncoupler and back up slightly with the couplers still over the uncoupler, allowing slack to occur between couplers.

How They Work

1. Stop with the couplers over an uncoupler and back up slightly with the couplers still over the uncoupler, allowing slack to occur between couplers.

2. Pull forward bringing coupler off the uncoupler. Couplers will snap to the delayed position.

How They Work

1. Stop with the couplers over an uncoupler and back up slightly with the couplers still over the uncoupler, allowing slack to occur between couplers.

2. Pull forward bringing coupler off the uncoupler. Couplers will snap to the delayed position.

3. Back up, pushing the car(s) to the desired location. Do not permit slack to develop between couplers.

How They Work

1. Stop with the couplers over an uncoupler and back up slightly with the couplers still over the uncoupler, allowing slack to occur between couplers.

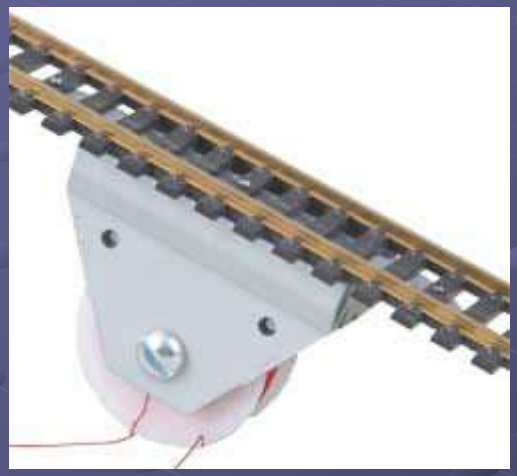
2. Pull forward bringing coupler off the uncoupler. Couplers will snap to the delayed position.

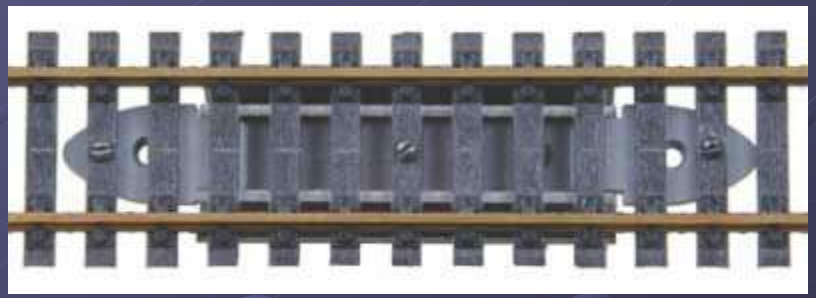
3. Back up, pushing the car(s) to the desired location. Do not permit slack to develop between couplers.

4. Pull forward, leaving the car(s) where desired. Couplers will automatically return to normal coupling position.

Electrically Operated

#309 Electric Under-The-Track Delayed-Action Uncoupler





DCC Operated Couplers

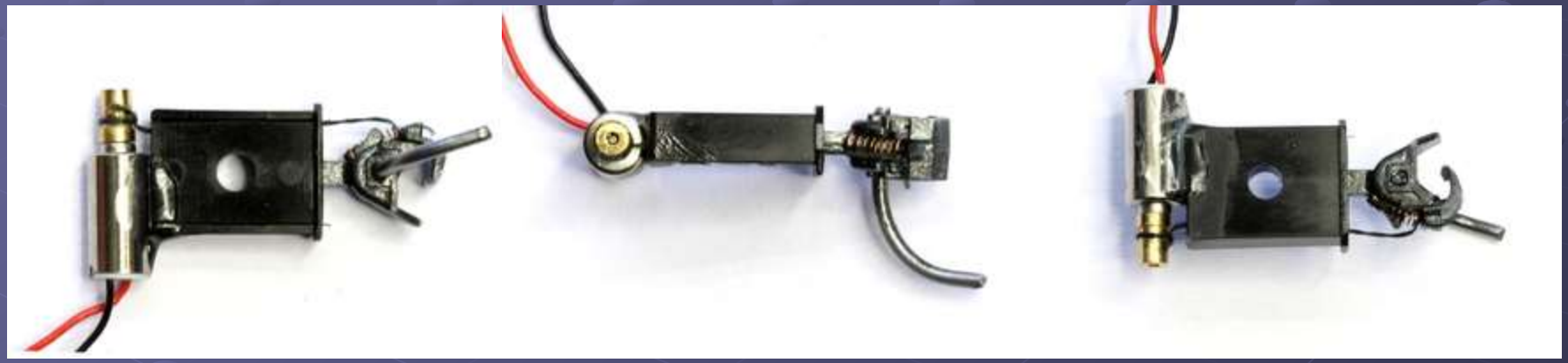
Kadee Remote Uncoupling System

- G, #1 Gauge
- Primarily Radio Controlled
- Uses standard R/C servo motor
- Servo controller can be operated by DCC, Airwire, or Blue-tooth

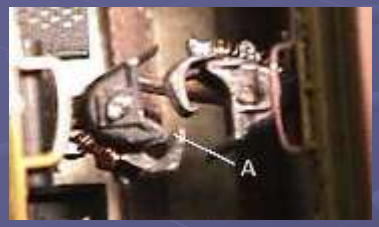
- *Product Revue can be read in February 2015 Garden Railways Magazine*

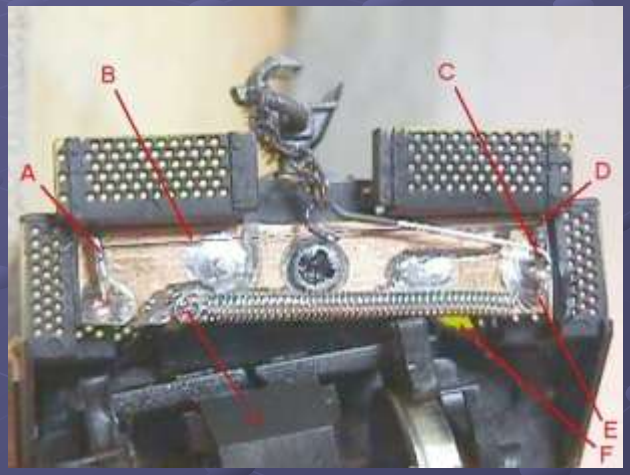
Proto Coupler by MTH

Preci-Models (Kit)

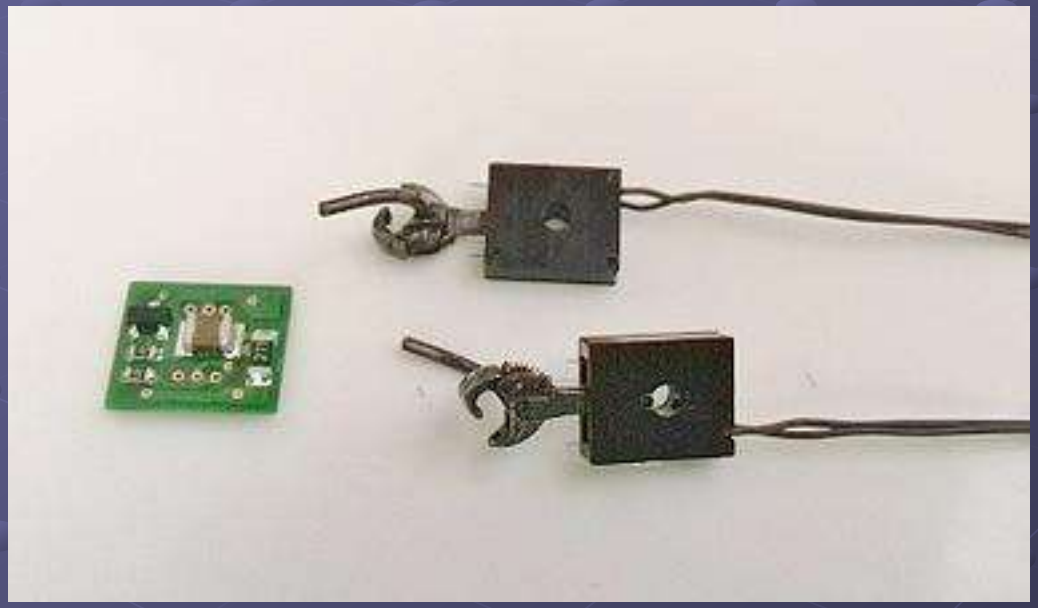


RR-CirKits





Smart-Coupler by Subarashi Models



Smart-Coupler Description

- Uses Kadee®Scale Head Whisker®Couplers.
- Same functions as Kadee®Coupler for automatic coupling and uncoupling.
- Coupler Gear box size is 8x3x10mm (same as Kadee #242 Gear Box) .
- The controller PC (printed-circuit) board is 0.4in. × 0.45 in.
- Easy to wire. (The input of the controller PC board are wired to some function output of DCC decoder.)
- Function "ON" opens the head of coupler for uncoupling, and Function "OFF" closes the head. If you forget the "OFF", the head of coupler is automatically closed.
- There is special mechanism in the Gearbox. Smart Coupler swings the neck smoothly. This movement ensures the uncoupling operation of the coupler.
- You may cut off the Trip Pin if the coupler disturbs the pilot of the Loco. If you cut off the Trip Pin, you cannot use delayed magnetic uncoupling.
- One function type connects two couplers in series and move them at the same time. Two-function type uses two function buttons and moves two couplers separately.

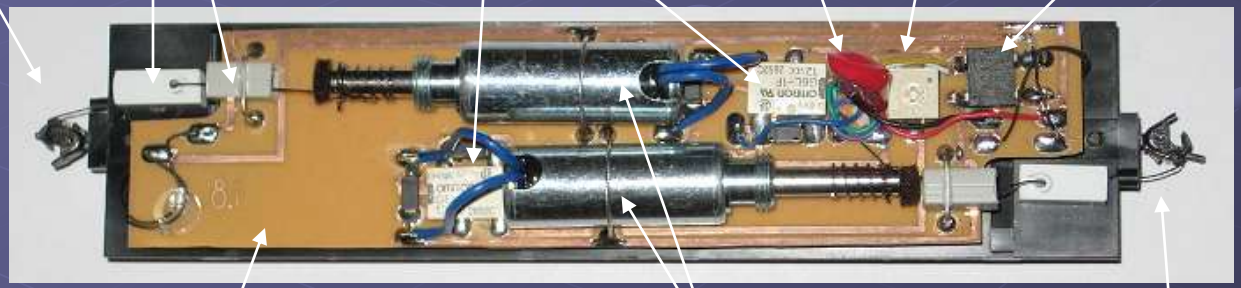
Smart-Coupler Operation

Smart-Coupler Status

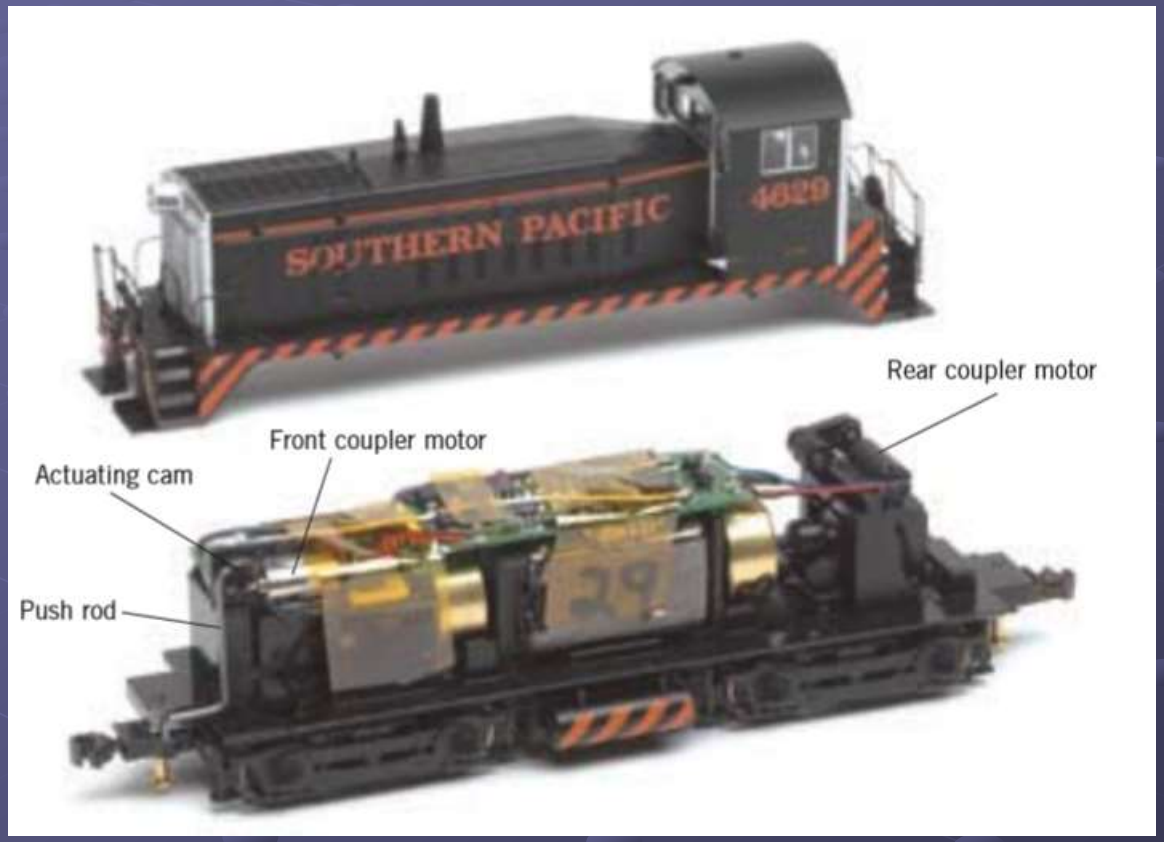
- Planned product release March 2016
- Current glitches:
  - Affected by temperature variations
  - Difficulty obtaining export permit to USA
- Sign up for newsletter at Subarashi website: http://www.smart-coupler.com

System 50

System 50

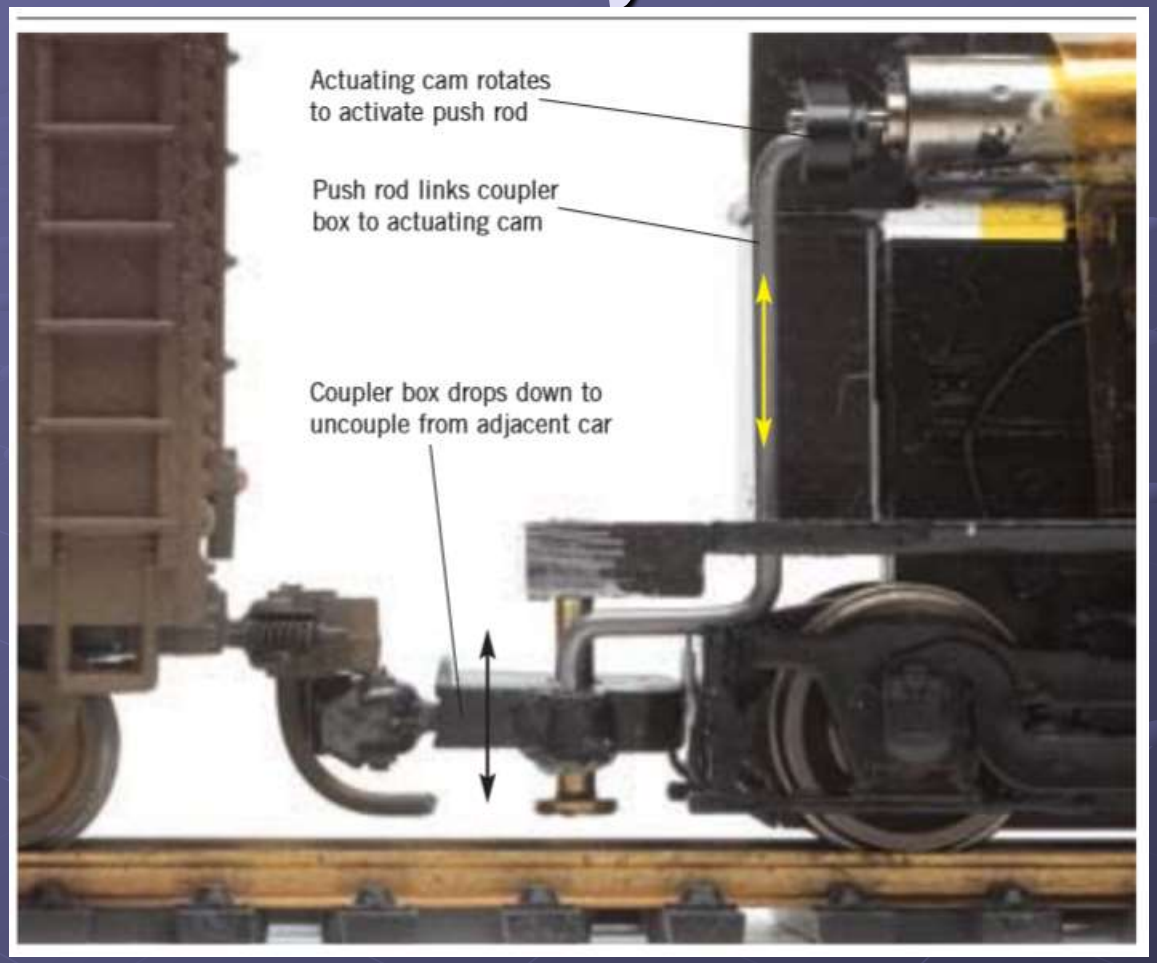

Standard Kadee #5 Coupler
Thread Guides
Relays
TF4 Decoder
Trim pot
Rectifier
F3 operates the “B” or brake end
F4 operates the “A” end
Solenoids
PC board mounted to floor of car
Standard Kadee #5 Coupler

Tony's



Retro-fit Digital Command Control operated uncoupling kit for Life-Like Proto 2000 SW-style locomotives.

Tony's


Actuating cam rotates to activate push rod
Push rod links coupler box to actuating cam
Coupler box drops down to uncouple from adjacent car

Automation

Computerized and Software Controlled Coupling & Uncoupling

First Big Challenge
Rolling Stock Detection

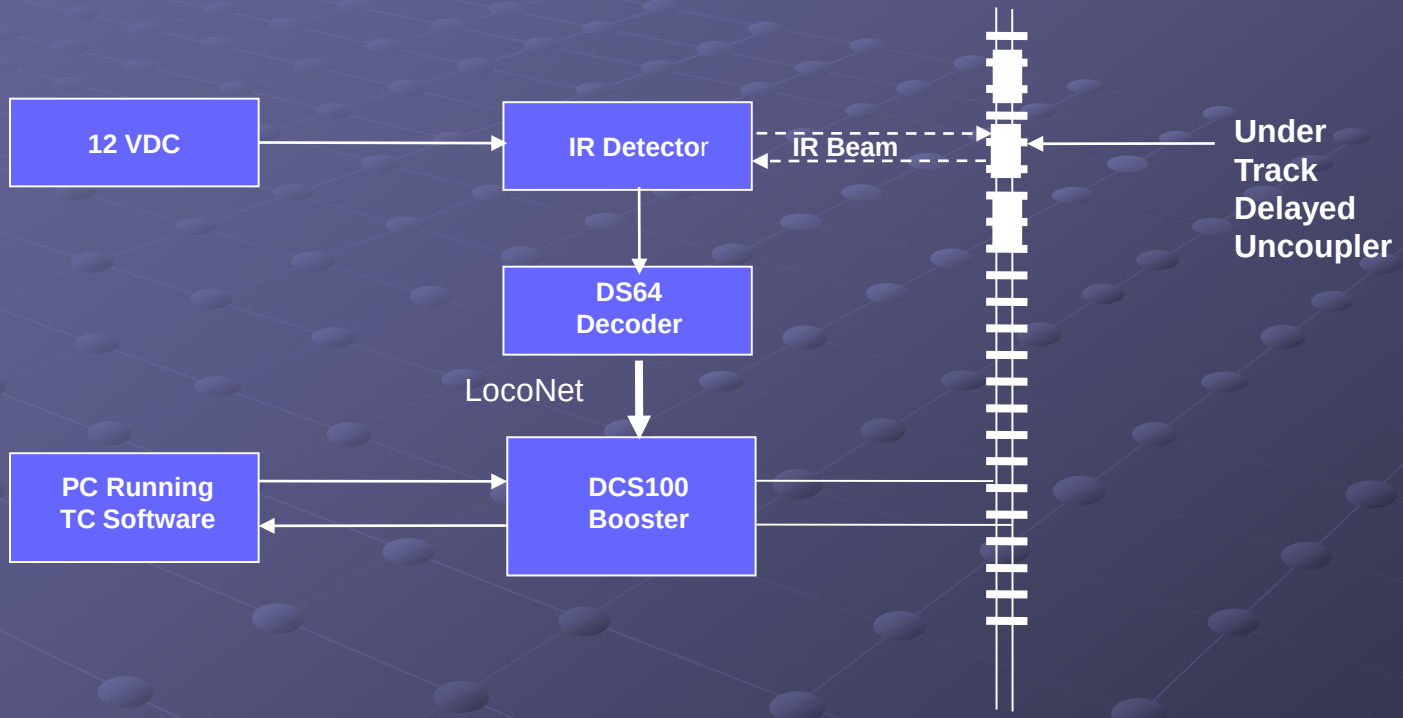
- Possible solutions: reed switch, micro-switch, software timing, IR detection
- Needs to be reliable
- Must be accurate – over uncoupler device
- Cost effective
- Provide electrically compatible signal to a stationary decoder
- Operate in all layout conditions (lighting)

IR Detection

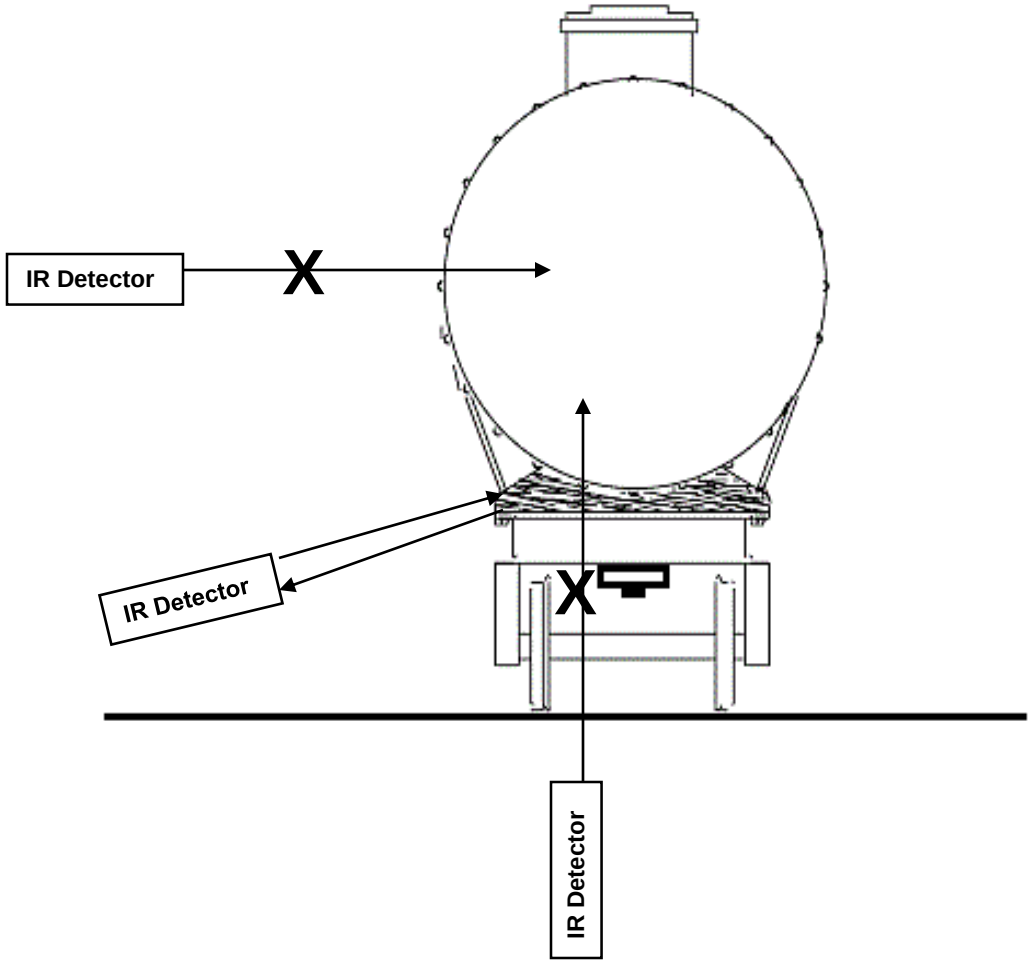
- TrainWhisperer © InfraRed Proximity Detector (IRPD)
  - Pulsed infrared LED
  - Synchronized IR detector
  - Motion & color blind
  - Operates in all lighting conditions
  - Uses Regulated 4.5 to 16 VDC
  - Drives most devices: RR-CirKits TC-64, Digitrax DS64 or SE8C

TrainWhisperer © IRPD

Detection Block Diagram

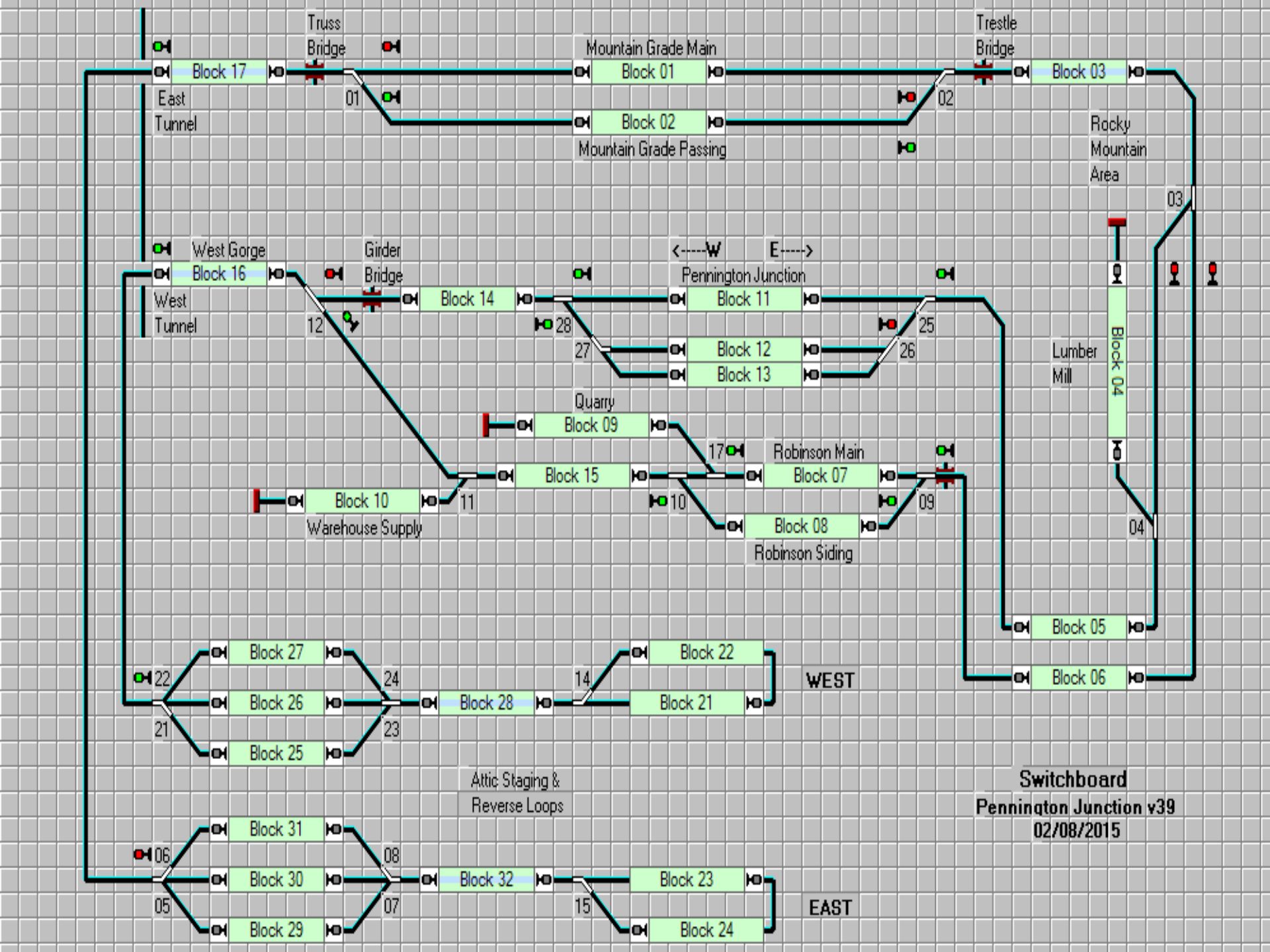


Car Detection Geometry

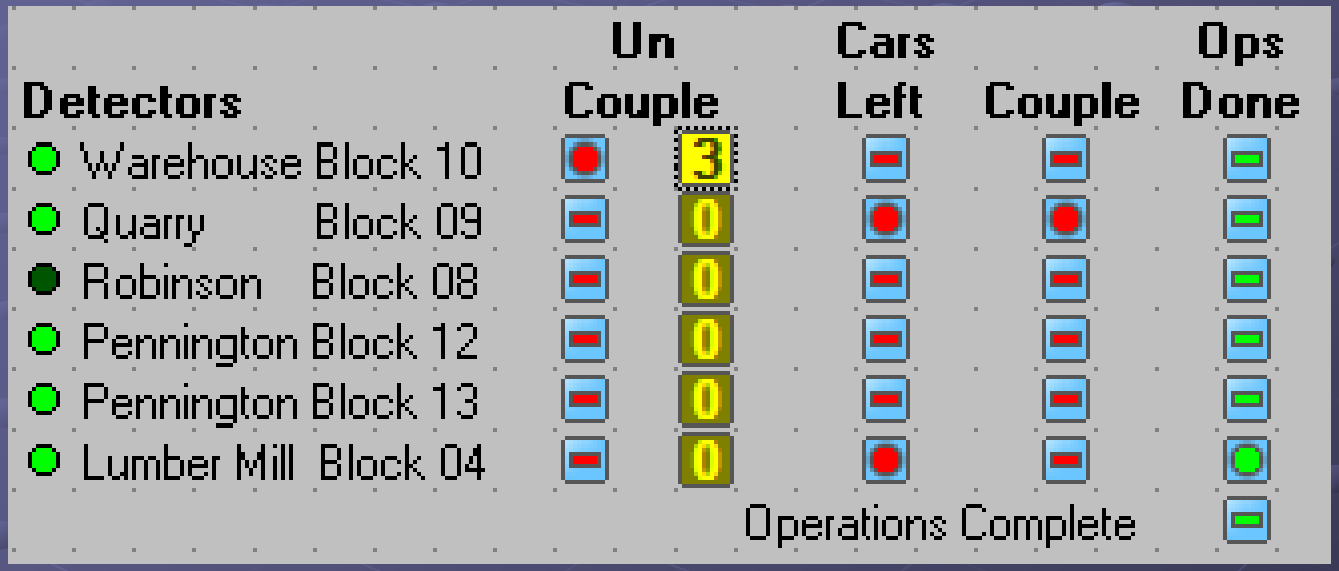



B.&L.E.
20006

Software Control

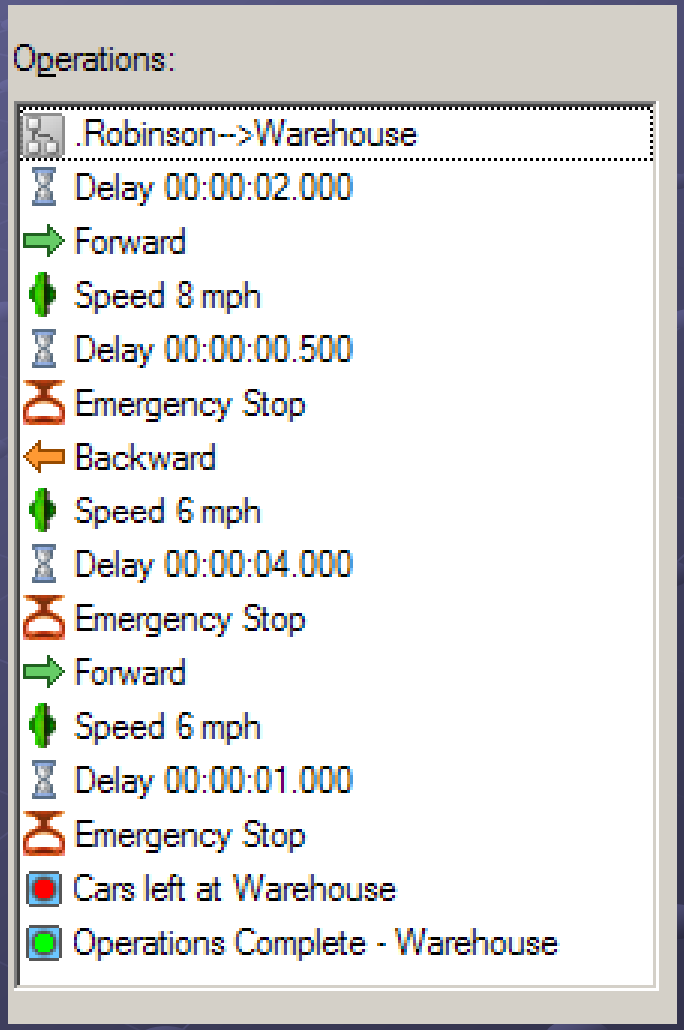

Truss Bridge
Block 17
East Tunnel
01
Mountain Grade Main
Block 01
Block 02
Mountain Grade Passing
02
Trestle Bridge
Block 03
Rocky Mountain Area
03
West Gorge
Block 16
West Tunnel
Girder Bridge
Block 14
12
28
<-----W E----->
Pennington Junction
Block 11
25
27
Block 12
Block 13
26
Lumber Mill
Block 04
04
Quarry
Block 09
17
Robinson Main
Block 07
Block 15
10
09
Block 10
Warehouse Supply
11
Block 08
Robinson Siding
Block 05
Block 06
Block 27
Block 26
Block 25
22
21
24
23
Block 28
Block 22
Block 21
14
WEST
Attic Staging &
Reverse Loops
Block 31
Block 30
Block 29
06
05
08
07
Block 32
Block 23
Block 24
15
EAST
Switchboard
Pennington Junction v39
02/08/2015

Switchboard Indicators



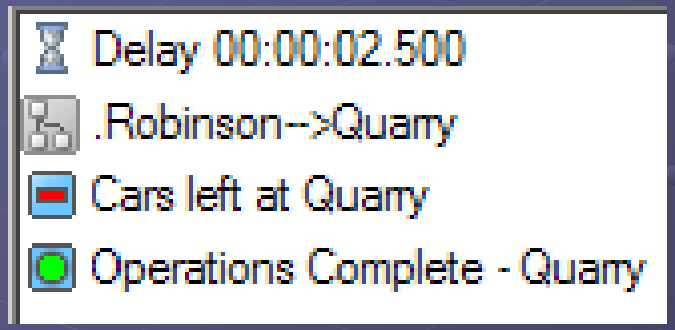
Uncoupling Macro

- Used to operate layout components
- Contains sequences of operations
- The “Kadee Shuffle”



Uncoupling Operation

Coupling Macro



Coupling Operation

Mainline Operation with an Uncoupling Car

Summary

- Variety of coupler products available
- Many uncoupler application options
- Promise of new DCC products to come
- Principles discussed apply to all gauges
- Automated uncoupling can enhance switching operations
- Reliable rolling stock detection key to software control

Closing Tips

- Use magnetic uncouplers only on sidings and spurs
- Use a function car as an idler car for mainline uncoupling
- Remove all steel weights from rolling stock
- Standardize on a coupler for your layout
- Use the appropriate tools for coupler adjustment

The End