

Create a Detailed CTC Machine Model with JMRI/PanelPro

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Other Clinics in this series:

- Introduction to Layout Control with JMRI/PanelPro

8:30 PM, Sunday, July 13th

- Add Signals to your Layout with JMRI/PanelPro

10:00 PM, Sunday, July 13th

- Introduction to Layout Control with JMRI/PanelPro

Repeated 4:00 PM, Friday, July 18th



CTC Logix



- Logix
 - The CTC panel that we have just covered is controlled by JMRI Logix rather than a cabinet full of relays like the prototype.



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 - Remember that the CTC panel and its equipment are acting as a over ride controlling interface for the basic ABS system that is located in the trackside signal control boxes.
 - Commands are sent back and forth between the plant and the CTC system via a pulse width encoding system.



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 - The CTC panel that we have just covered is controlled by JMRI Logix rather than a cabinet full of relays like the prototype.
 - Remember that the CTC panel and its equipment are acting as a over ride controlling interface for the basic ABS system that is located in the trackside signal control boxes.
 - Commands are sent back and forth between the plant and the CTC system via a pulse width encoding system.
 - The prototype used one line to send and receive all information for each of the plants under its control.



CTC Logix

- Logix
 - The coded commands actually were sent quite slowly and one at a time. We will simulate the delays and relay sounds, but not the fact that each command had to be queued before it was sent. This may cause overlapping relay sounds in our simulation that were not heard in the original panels.



CTC Logix

- Logix
 - I have tried to divide the Logix entries in a way that not only makes them possible to understand, but also to allow some potential for automatic generation of the CTC logic similar to SSL.

System...	User Name	Enabled	Delete	Edit
DX:SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SI:	Plant 10 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SL:	Plant 10 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SND:	Plant 10 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:INIT:	Plant 12 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:ITD:	12 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:MTD:	12 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:PTD:	12 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SH:	Plant 12 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SI:	Plant 12 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SL:	Plant 12 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SND:	Plant 12 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Logix
 - I have tried to divide the Logix entries in a way that not only makes them possible to understand, but also to allow some potential for automatic generation of the CTC logic similar to SSL.
 - Logix relating to the signals are called 'Plant' and are prefixed with "IX:P---".

System...	User Name	Enabled	Delete	Edit
DX:SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SI:	Plant 10 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SL:	Plant 10 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SND:	Plant 10 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:INIT:	Plant 12 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:ITD:	12 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:MTD:	12 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:PTD:	12 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SH:	Plant 12 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SI:	Plant 12 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SL:	Plant 12 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SND:	Plant 12 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Logix
 - I have tried to divide the Logix entries in a way that not only makes them possible to understand, but also to allow some potential for automatic generation of the CTC logic similar to SSL.
 - Logix relating to the signals are called 'Plant' and are prefixed with "IX:P---".
 - Logix that control the switches are "IX:S---".

System...	User Name	Enabled	Delete	Edit
IX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:INIT:	Plant 8 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:ITD:	8 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:MTD:	8 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:PTD:	8 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:SH:	Plant 8 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:SI:	Plant 8 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:SL:	Plant 8 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:SND:	Plant 8 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
IX:S11:OS:	Switch 11 OS	<input checked="" type="checkbox"/>	Delete	Edit
IX:S11:SC:	Switch 11 Control	<input checked="" type="checkbox"/>	Delete	Edit
IX:S5:OS:	Switch 5 OS	<input checked="" type="checkbox"/>	Delete	Edit
IX:S5:SC:	Switch 5 Control	<input checked="" type="checkbox"/>	Delete	Edit
IX:S7:OS:	Switch 7 OS	<input checked="" type="checkbox"/>	Delete	Edit
IX:S7:SC:	Switch 7 Control	<input checked="" type="checkbox"/>	Delete	Edit
IX:S9:OS:	Switch 9 OS	<input checked="" type="checkbox"/>	Delete	Edit
IX:S9:SC:	Switch 9 Control	<input checked="" type="checkbox"/>	Delete	Edit
IX:TRA:IN:	Off panel traffic	<input checked="" type="checkbox"/>	Delete	Edit



CTC Logix

- Logix
 - The 'IX:P' is followed by each signals panel position number. (not the mile marker or actual signal name.) e.g. 12.

System...	User Name	Enabled	Delete	Edit
DX-SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SI:	Plant 10 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SL:	Plant 10 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SND:	Plant 10 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:INIT:	Plant 12 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:ITD:	12 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:MTD:	12 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:PTD:	12 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SH:	Plant 12 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SI:	Plant 12 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SL:	Plant 12 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SND:	Plant 12 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit

Add ...

CTC Logix



- Logix

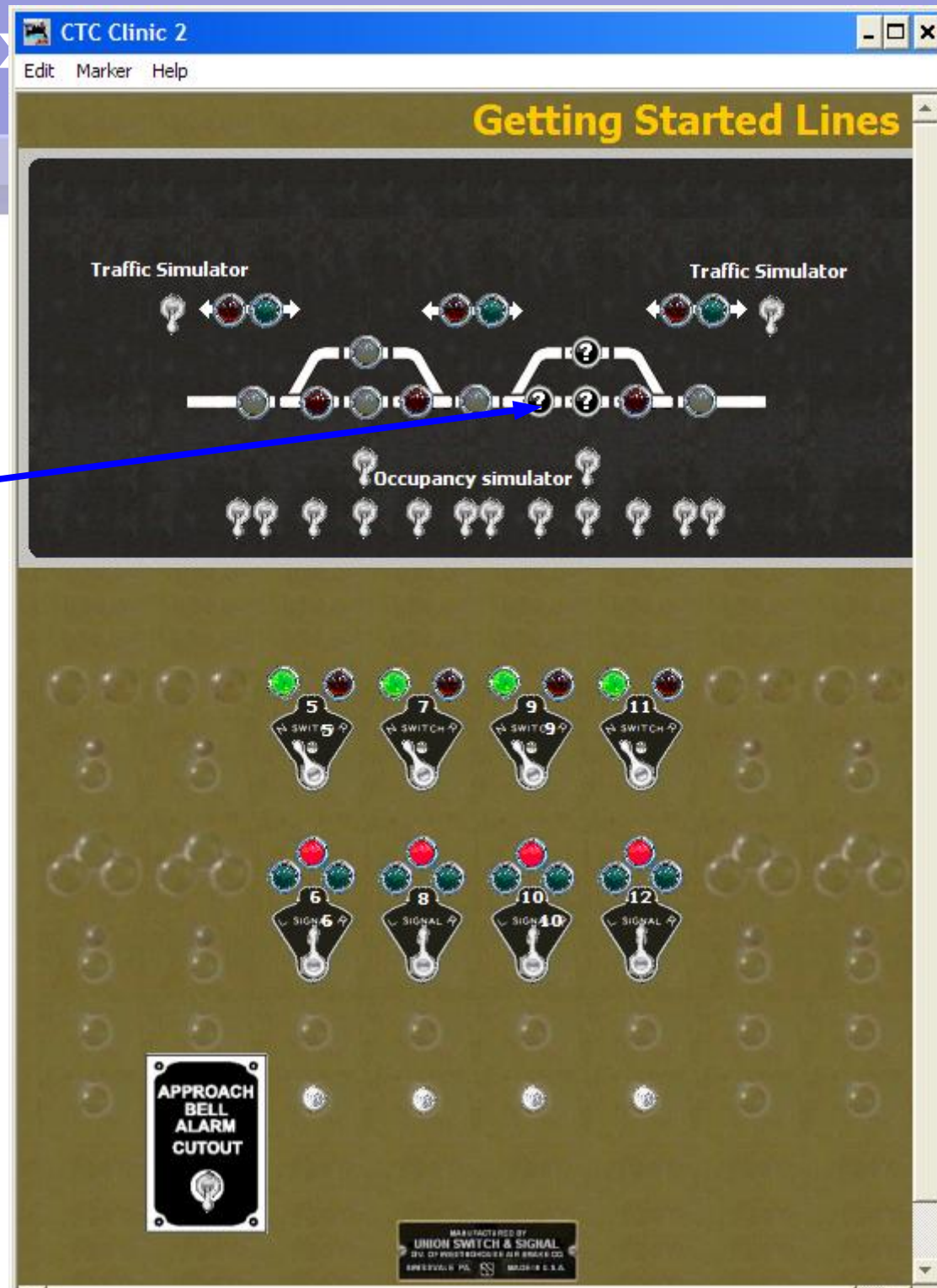
- The 'IX:P' is followed by each signals panel position number. (not the mile marker or actual signal name.) e.g. 12.
- In like manner the switches are identified by their panel location. e.g. 5.

System...	User Name	Enabled	Delete	Edit
IX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:INIT:	Plant 8 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:ITD:	8 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:MTD:	8 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:PTD:	8 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:SH:	Plant 8 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:SI:	Plant 8 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:SL:	Plant 8 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
IX:P8:SND:	Plant 8 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
IX:S11:OS:	Switch 11 OS	<input checked="" type="checkbox"/>	Delete	Edit
IX:S11:SC:	Switch 11 Control	<input checked="" type="checkbox"/>	Delete	Edit
IX:55:OS:	Switch 5 OS	<input checked="" type="checkbox"/>	Delete	Edit
IX:55:SC:	Switch 5 Control	<input checked="" type="checkbox"/>	Delete	Edit
IX:57:OS:	Switch 7 OS	<input checked="" type="checkbox"/>	Delete	Edit
IX:57:SC:	Switch 7 Control	<input checked="" type="checkbox"/>	Delete	Edit
IX:59:OS:	Switch 9 OS	<input checked="" type="checkbox"/>	Delete	Edit
IX:59:SC:	Switch 9 Control	<input checked="" type="checkbox"/>	Delete	Edit
IX:TRA:IN:	Off panel traffic	<input checked="" type="checkbox"/>	Delete	Edit



Initial State

- As soon as we load the panel we need to initialize the plant. Initially all of our IS and IT entries will come up as unknown and remain that way until we activate them. It would be very annoying to the CTC operator to require him to click on every entry point, so we will devise a Logix to do that work for him.
- Note: some hardware does not remember its last state and also must be initialized after power on in a similar way.





CTC Logix

- Conditionals
 - First we initialize each plant.

System...	User Name	Enabled	Delete	Edit
DX-SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SI:	Plant 10 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SL:	Plant 10 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SND:	Plant 10 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:INIT:	Plant 12 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:ITD:	12 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:MTD:	12 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:PTD:	12 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SH:	Plant 12 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SI:	Plant 12 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SL:	Plant 12 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SND:	Plant 12 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Conditionals
 - First we initialize each plant.
 - Each plant has its own initialization because a large panel would have too many actions to fit in one operation.

System...	User Name	Enabled		
DX-SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:P10:INIT:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:P10:INIT:C1	Init Check	False	Edit

New Conditional Reorder Calculate

Done Delete Logix

Conditionals



Init Check

IF (Expression)

- **NOT** IS:IP
(Internal Sensor Initialize Panel) active

THEN (Action)

- 1. Trigger Route IR:P10:INIT to do the work.

Note: one of the things one route will do is set the internal sensor IS:IP active to prevent it from happening again.

Conditional System Name IX:P10:INIT:C1

Conditional User Name

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
NOT	Sensor Active	IS:IP	N/A	N/A	<input checked="" type="checkbox"/>		Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type

Update Conditional Cancel Delete Conditional



CTC Logix

- Routes

- The route initializes the turnout that is part of this plant.

Add/Edit Route

Route System Name: IR:P10:INIT

Route User Name:

Show All Included Turnouts and Sensors

Please select Turnouts to be included in this Route.

System Name	User Name	Include	Set State
LT9	Switch 9	<input checked="" type="checkbox"/>	Set Closed

Please select Sensors to be included in this Route.

System Name	User Name	Include	Set State
IS:P10:CB	Plant 10 Code Button	<input checked="" type="checkbox"/>	Set Inactive
IS:P10:SLI	Plant 10 Signal Left Indicator	<input checked="" type="checkbox"/>	Set Inactive
IS:P10:SLL	Plant 10 Signal Left Lever	<input checked="" type="checkbox"/>	Set Inactive
IS:P10:SLR	Plant 10 Stack L Register	<input checked="" type="checkbox"/>	Set Inactive
IS:P10:SNI	Plant 10 Signals Normal Indicator	<input checked="" type="checkbox"/>	Set Active

Play sound file: Run script:

Enter Sensor that Activates when Route Turnouts are correctly aligned (optional):

Enter Sensors that trigger this Route (optional)

Sensors: On Active On Active On Active

Enter a Turnout that triggers this Route (optional)

Turnout: Condition:

Enter additional delay between Turnout Commands (optional), added delay: (milliseconds)

Enter a Turnout that controls the lock for this Route (optional)

Turnout: Condition:

To change this Route, make changes above, then click 'Update Route'.
To leave Edit mode, without changing this Route, click 'Cancel'.

Delete Route Update Route Cancel



CTC Logix

■ Routes

- The route initializes the turnout that is part of this plant.
- And then sets all the various indicators so the panel looks OK when it starts up.

Add/Edit Route

Route System Name: IR:P10:INIT

Route User Name:

Show All Included Turnouts and Sensors

Please select Turnouts to be included in this Route.

System Name	User Name	Include	Set State
LT9	Switch 9	<input checked="" type="checkbox"/>	Set Closed

Please select Sensors to be included in this Route.

System Name	User Name	Include	Set State
IS:P10:CB	Plant 10 Code Button	<input checked="" type="checkbox"/>	Set Inactive
IS:P10:SLI	Plant 10 Signal Left Indicator	<input checked="" type="checkbox"/>	Set Inactive
IS:P10:SLL	Plant 10 Signal Left Lever	<input checked="" type="checkbox"/>	Set Inactive
IS:P10:SLR	Plant 10 Stack L Register	<input checked="" type="checkbox"/>	Set Inactive
IS:P10:SNI	Plant 10 Signals Normal Indicator	<input checked="" type="checkbox"/>	Set Active

Play sound file: Run script:

Enter Sensor that Activates when Route Turnouts are correctly aligned (optional):

Enter Sensors that trigger this Route (optional)

Sensors: On Active On Active On Active

Enter a Turnout that triggers this Route (optional)

Turnout: Condition:

Enter additional delay between Turnout Commands (optional), added delay: (milliseconds)

Enter a Turnout that controls the lock for this Route (optional)

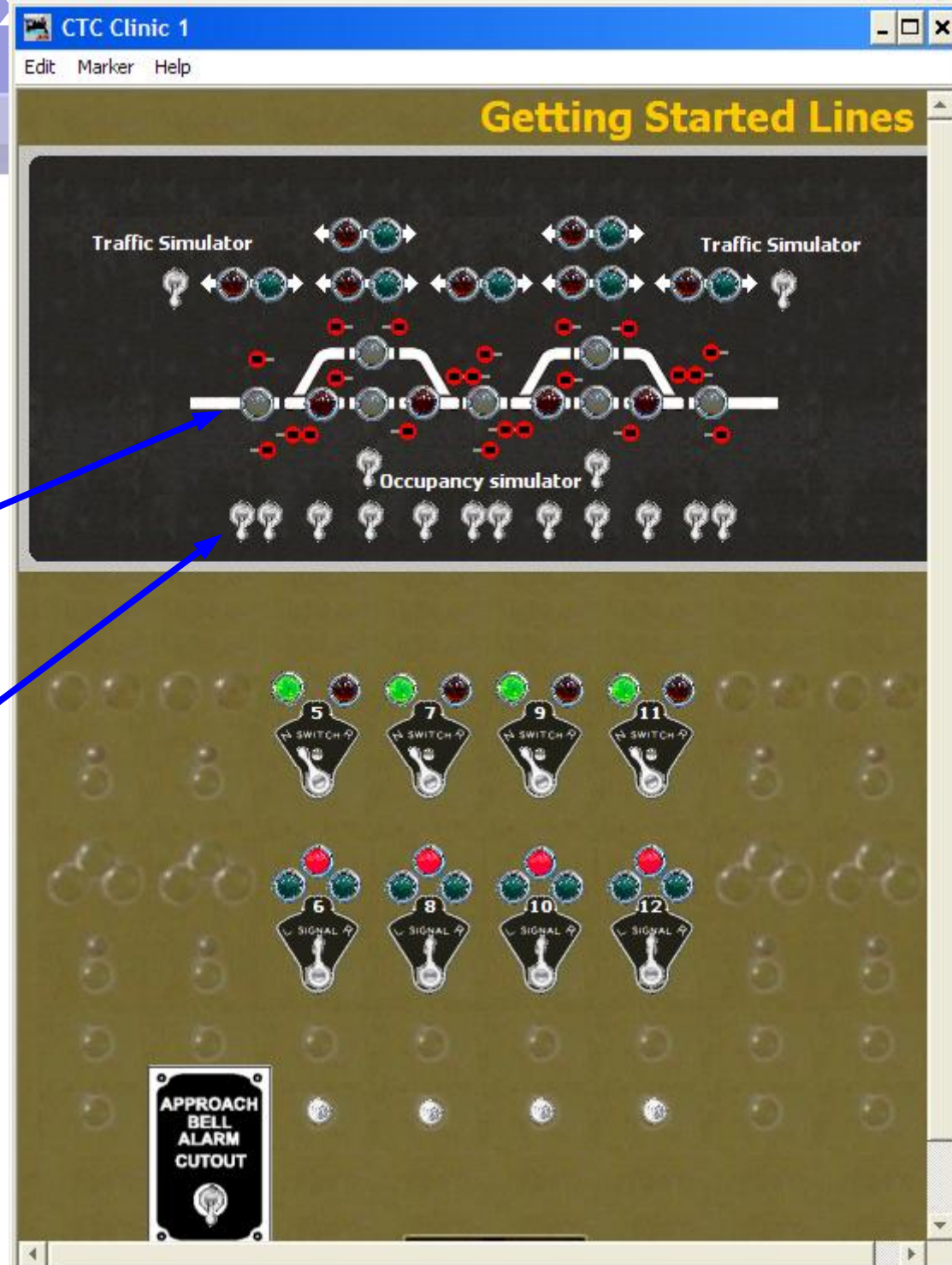
Turnout: Condition:

To change this Route, make changes above, then click 'Update Route'.
To leave Edit mode, without changing this Route, click 'Cancel'.



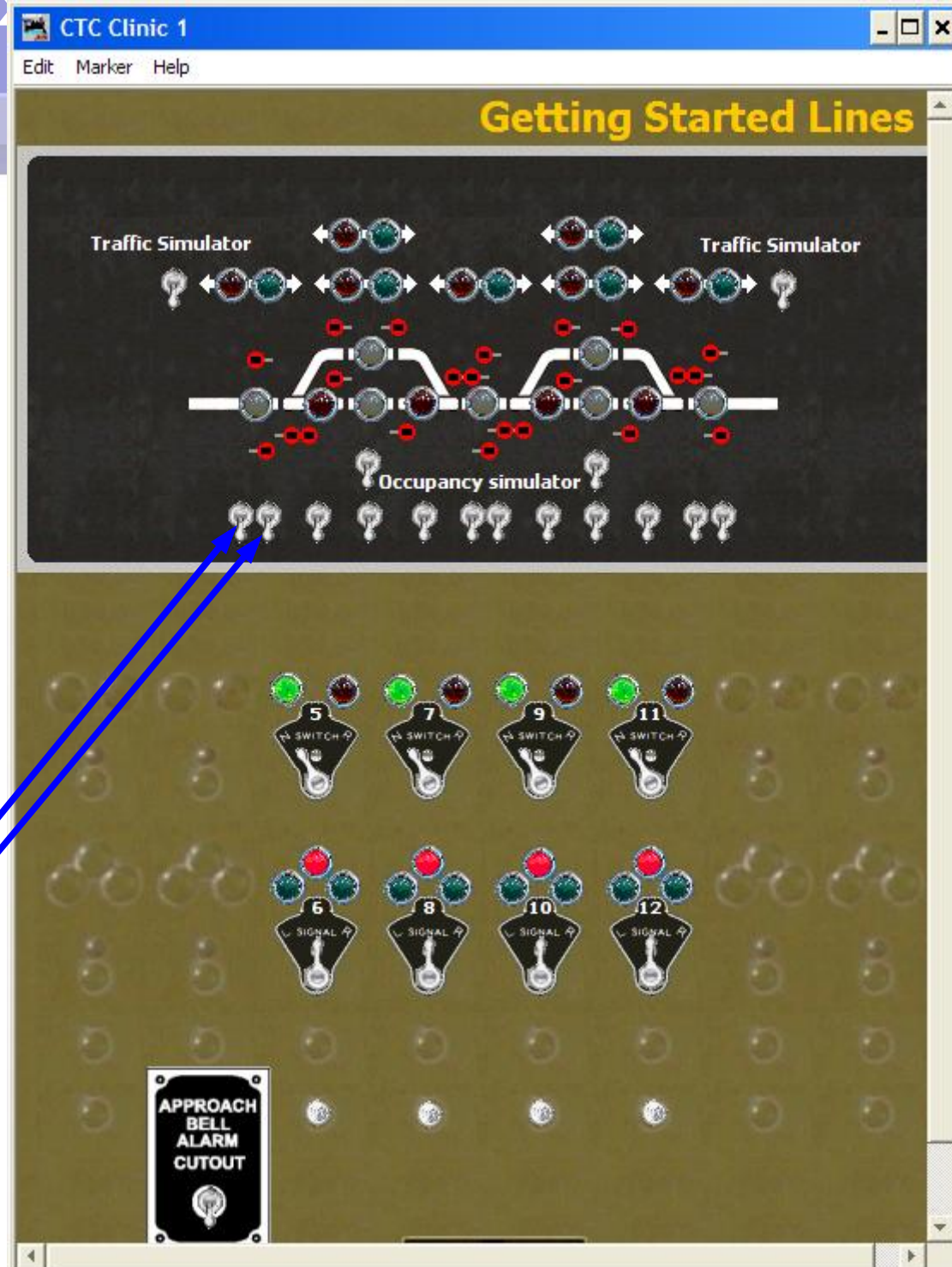
CTC Logix

- Sensor Input
 - Sensor inputs trigger a code relay sequence and then light the corresponding lamp. Remember this demo allows you to simulate the sensor inputs by flipping the toggle switches.





- Sensor Input
 - Sensor inputs trigger a code relay sequence and then light the corresponding lamp. Remember this demo allows you to simulate the sensor inputs by flipping the toggle switches.
 - We are simulating two intermediate blocks. The CTC indication shows them all as one lamp.





CTC Logix

- Logix
 - The sensor inputs are all under IX:SENS. We will look at them first.

System...	User Name	Enabled	Delete	Edit
DX:SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SI:	Plant 10 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SL:	Plant 10 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SND:	Plant 10 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:INIT:	Plant 12 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:ITD:	12 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:MTD:	12 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:PTD:	12 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SH:	Plant 12 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SI:	Plant 12 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SL:	Plant 12 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SND:	Plant 12 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Logix
 - The sensor inputs are all under IX:SENS. We will look at them first.
 - Click 'Edit' to open the list of conditionals.

System...	User Name	Enabled	Delete	Edit
DX:SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SI:	Plant 10 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SL:	Plant 10 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SND:	Plant 10 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:INIT:	Plant 12 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:ITD:	12 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:MTD:	12 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:PTD:	12 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SH:	Plant 12 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SI:	Plant 12 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SL:	Plant 12 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P12:SND:	Plant 12 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Conditionals
 - Each sensor has its own entry.

System...	User Name	Enabled		
DX-SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX-SENS-IN:
Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX-SENS-IN:C1	LS1-on	False	Edit
DX-SENS-IN:C3	LS2-on	False	Edit
DX-SENS-IN:C4	LS2-off	True	Edit
DX-SENS-IN:C5	LS3-on	False	Edit
DX-SENS-IN:C6	LS3-off	True	Edit
DX-SENS-IN:C7	LS4-on	False	Edit
DX-SENS-IN:C8	LS4-off	True	Edit
DX-SENS-IN:C9	LS5-on	False	Edit
DX-SENS-IN:C10	LS5-off	True	Edit
DX-SENS-IN:C11	LS6-on	False	Edit
DX-SENS-IN:C12	LS6-off	True	Edit

New Conditional Reorder Calculate

Done Delete Logix



CTC Logix

- Conditionals
 - Each sensor has its own entry.
 - Click 'Edit' for each Conditional's list of variables and actions. Start with LS2-on.

System...	User Name	Enabled		
DX-SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX-SENS-IN:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX-SENS-IN:C1	LS1-on	False	Edit
DX-SENS-IN:C3	LS2-on	False	Edit
DX-SENS-IN:C4	LS2-off	True	Edit
DX-SENS-IN:C5	LS3-on	False	Edit
DX-SENS-IN:C6	LS3-off	True	Edit
DX-SENS-IN:C7	LS4-on	False	Edit
DX-SENS-IN:C8	LS4-off	True	Edit
DX-SENS-IN:C9	LS5-on	False	Edit
DX-SENS-IN:C10	LS5-off	True	Edit
DX-SENS-IN:C11	LS6-on	False	Edit
DX-SENS-IN:C12	LS6-off	True	Edit

New Conditional Reorder Calculate

Done Delete Logix

Conditionals



LS2-on

IF (Expression)

- LS2 (The sensor or panel toggle image) is active

THEN (Action)

1. Play the sound of relays
2. Delay for 5 sec. And then turn on the lamp.

Note: This conditional is simple, with a 1:1 relationship between the expression and its resulting actions.

Conditional System Name IX-SENS-IN:C3

Conditional User Name LS2-on

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	Delete
	Sensor Active	LS2	N/A	N/A		<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Play Sound File Set sources/sounds/Code-receive.wav

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Delayed Set Sensor IS:S5:OSI Active 5

Update Conditional Cancel Delete Conditional



CTC Logix

- Conditionals
 - Each sensor has its own entry.
 - Click 'Edit' for each Conditional's list of variables and actions. Start with LS2-on.
 - 'LS2-off' is just the reverse of 'LS2-on'.

System...	User Name	Enabled	Delete	Edit
DX-SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX-SENS-IN:
Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	Edit
DX-SENS-IN:C1	LS1-on	False	Edit
DX-SENS-IN:C3	LS2-on	False	Edit
DX-SENS-IN:C4	LS2-off	True	Edit
DX-SENS-IN:C5	LS3-on	False	Edit
DX-SENS-IN:C6	LS3-off	True	Edit
DX-SENS-IN:C7	LS4-on	False	Edit
DX-SENS-IN:C8	LS4-off	True	Edit
DX-SENS-IN:C9	LS5-on	False	Edit
DX-SENS-IN:C10	LS5-off	True	Edit
DX-SENS-IN:C11	LS6-on	False	Edit
DX-SENS-IN:C12	LS6-off	True	Edit

New Conditional Reorder Calculate
Done Delete Logix



CTC Logix

- Conditionals
 - Each sensor has its own entry.
 - Click 'Edit' for each Conditional's list of variables and actions. Start with 'LS2-on'.
 - 'LS2-off' is just the reverse of 'LS2-on'.
 - Next look at LS1-on.

System...	User Name	Enabled		
DX-SENS-IN:	Sensor inputs	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:INIT:	Plant 10 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:ITD:	10 Intermediate Traffic Dir...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:MTD:	10 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:PTD:	10 Passing Traffic Directio...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P10:SH:	Plant 10 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX-SENS-IN:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX-SENS-IN:C1	LS1-on	False	Edit
DX-SENS-IN:C3	LS2-on	False	Edit
DX-SENS-IN:C4	LS2-off	True	Edit
DX-SENS-IN:C5	LS3-on	False	Edit
DX-SENS-IN:C6	LS3-off	True	Edit
DX-SENS-IN:C7	LS4-on	False	Edit
DX-SENS-IN:C8	LS4-off	True	Edit
DX-SENS-IN:C9	LS5-on	False	Edit
DX-SENS-IN:C10	LS5-off	True	Edit
DX-SENS-IN:C11	LS6-on	False	Edit
DX-SENS-IN:C12	LS6-off	True	Edit

New Conditional Reorder Calculate

Done Delete Logix



Conditionals

LS1-on

We are now watching the state of the first two blocks which form an intermediate block. If neither sensor is active, and then either one becomes active, we will play the relay sound, delay for 5 seconds while the sound plays, and then turn on the lamp.

Long sections of single track are often formed of several blocks, each with their own signals. The CTC machine only shows the operator that one or more of these blocks is occupied.

Conditional System Name IX-SENS-IN:C1

Conditional User Name LS1-on

Logical Expression

State Variables (max 20)

		Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
		Sensor Active	LS1	N/A	N/A		<input checked="" type="checkbox"/>	Delete
AND	NOT	Sensor Active	LS4	N/A	N/A		<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Play Sound File Set ources/sounds/Code-receive.wav

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Delayed Set Sensor IS:S5:ITI Active 5

Update Conditional Cancel Delete Conditional



Conditionals

LS1-on

IF (Expression)

- LS1 (The sensor or panel toggle image) is active
- AND LS4 is NOT already active

THEN (Action)

1. Play the sound of relays
2. Delay for 5 sec. And then turn on the lamp.

Conditional System Name IX-SENS-IN:C1

Conditional User Name LS1-on

Logical Expression

State Variables (max 20)

		Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	Delete
		Sensor Active	LS1	N/A	N/A		<input checked="" type="checkbox"/>	Delete
AND	NOT	Sensor Active	LS4	N/A	N/A		<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Play Sound File Set ources/sounds/Code-receive.wav

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Delayed Set Sensor IS:S5:ITI Active 5

Update Conditional Cancel Delete Conditional



CTC Logix

- Logix
 - Next we will look at the switch control levers.

System...	User Name	Enabled	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:INIT:	Plant 8 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:ITD:	8 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:MTD:	8 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:PTD:	8 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SH:	Plant 8 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SI:	Plant 8 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SL:	Plant 8 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SND:	Plant 8 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:OS:	Switch 11 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:SC:	Switch 11 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:OS:	Switch 5 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:SC:	Switch 5 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:OS:	Switch 7 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:SC:	Switch 7 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:OS:	Switch 9 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:SC:	Switch 9 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:TRA:IN:	Off panel traffic	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Logix
 - Next we will look at the switch control levers.
 - There are a series of conditionals.
 - Send Reverse

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:S5:SC:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:S5:SC:C1	Switch 5 Send Reverse	False	Edit
DX:S5:SC:C2	Switch 5 Send Normal	False	Edit
DX:S5:SC:C3	Switch 5 Thrown Feedback	False	Edit
DX:S5:SC:C4	Switch 5 Closed Feedback	True	Edit
DX:S5:SC:C5	Switch 5 RN	False	Edit
DX:S5:SC:C6	Switch 5 NR	False	Edit
DX:S5:SC:C7	Switch 5 consistent	True	Edit

New Conditional Reorder Calculate

Done Delete Logix



Conditionals

Send Reverse

IF (Expression)

- IS:P6:CB (The code button) is pressed
- IS:S5:CL (Control Lever) is inactive
- IS:S5:OSI (OS Ind.) is inactive
- IS:P6:SNI (Signals Normal)
- IS:S5:RI Not already Reverse

THEN (Action)

1. Play sound.
2. Send command.

Conditional System Name IX:S5:SC:C1

Conditional User Name Switch 5 Send Reverse

Logical Expression

State Variables (max 20)

		Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
		Sensor Active	IS:P6:CB	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
	AND	Sensor Inactive	IS:S5:CL	N/A	N/A	False	<input type="checkbox"/>	Delete
	AND	Sensor Inactive	IS:S5:OSI	N/A	N/A	True	<input type="checkbox"/>	Delete
	AND	Sensor Active	IS:P6:SNI	N/A	N/A	True	<input type="checkbox"/>	Delete
	AND NOT	Sensor Active	IS:S5:RI	N/A	N/A	True	<input type="checkbox"/>	Delete

All state variables are OK.

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Play Sound File Set resources/sounds/Code-send.wav

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Delayed Set Sensor IS:S5:SR Active 5

Update Conditional Cancel Delete Conditional



CTC Logix

- Logix
 - Next we will look at the switch control levers.
 - There are a series of conditionals.
 - Send Reverse
 - Send Normal

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:S5:SC:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:S5:SC:C1	Switch 5 Send Reverse	False	Edit
DX:S5:SC:C2	Switch 5 Send Normal	False	Edit
DX:S5:SC:C3	Switch 5 Thrown Feedback	False	Edit
DX:S5:SC:C4	Switch 5 Closed Feedback	True	Edit
DX:S5:SC:C5	Switch 5 RN	False	Edit
DX:S5:SC:C6	Switch 5 NR	False	Edit
DX:S5:SC:C7	Switch 5 consistent	True	Edit

New Conditional Reorder Calculate

Done Delete Logix



Conditionals

Send Normal

IF (Expression)

- IS:P6:CB (The code button) is pressed
- IS:S5:CL (Control Lever) is **active**
- IS:S5:OSI (OS Ind.) is inactive
- IS:P6:SNI (Signals Normal)
- IS:S5:NI Not already **Normal**

THEN (Action)

1. Play sound.
2. Send command.

Conditional System Name IX:S5:SC:C2

Conditional User Name Switch 5 Send Normal

Logical Expression

State Variables (max 20)

		Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
		Sensor Active	IS:P6:CB	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
	AND	Sensor Active	IS:S5:CL	N/A	N/A	False	<input type="checkbox"/>	Delete
	AND	Sensor Inactive	IS:S5:OSI	N/A	N/A	True	<input type="checkbox"/>	Delete
	AND	Sensor Active	IS:P6:SNI	N/A	N/A	True	<input type="checkbox"/>	Delete
	AND NOT	Sensor Active	IS:S5:NI	N/A	N/A	True	<input type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Play Sound File Set resources/sounds/Code-send.wav

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Delayed Set Sensor IS:S5:SN Active 5

Update Conditional Cancel Delete Conditional



CTC Logix

- Logix
 - Next we will look at the switch control levers.
 - There are a series of conditionals.
 - Send Reverse
 - Send Normal
 - Feedback

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:S5:SC:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:S5:SC:C1	Switch 5 Send Reverse	False	Edit
DX:S5:SC:C2	Switch 5 Send Normal	False	Edit
DX:S5:SC:C3	Switch 5 Thrown Feedback	False	Edit
DX:S5:SC:C4	Switch 5 Closed Feedback	True	Edit
DX:S5:SC:C5	Switch 5 RN	False	Edit
DX:S5:SC:C6	Switch 5 NR	False	Edit
DX:S5:SC:C7	Switch 5 consistent	True	Edit

New Conditional Reorder Calculate

Done Delete Logix



Conditionals

Rev Feedback

IF (Expression)

- LT5 (The turnout has moved)

THEN (Action)

1. Delay and then send command to set the indication.
2. Play sound.

Note: the two actions are performed immediately. The sound does not wait for the delay to complete. The result is, you hear the sound, then the lamp changes.

Conditional System Name IX:55:SC:C3

Conditional User Name Switch 5 Thrown Feedback

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	Delete
	Turnout Thrown	LT5	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Delayed Set Sensor IS:55:RI Active 5

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Play Sound File Set sources/sounds/Code-receive.wav

Update Conditional Cancel Delete Conditional



CTC Logix

- Logix
 - Next we will look at the switch control levers.
 - There are a series of conditionals.
 - Send Reverse
 - Send Normal
 - Feedback
 - In motion

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:S5:SC:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:S5:SC:C1	Switch 5 Send Reverse	False	Edit
DX:S5:SC:C2	Switch 5 Send Normal	False	Edit
DX:S5:SC:C3	Switch 5 Thrown Feedback	False	Edit
DX:S5:SC:C4	Switch 5 Closed Feedback	True	Edit
DX:S5:SC:C5	Switch 5 RN	False	Edit
DX:S5:SC:C6	Switch 5 NR	False	Edit
DX:S5:SC:C7	Switch 5 consistent	True	Edit

New Conditional Reorder Calculate

Done Delete Logix



Conditionals

Out of correspondance

IF (Expression)

- IS:S5:CL (The lever is Reversed)
- The indicator is NOT yet reverse

THEN (Action)

- 1. No action

Note:

This conditional does not do anything, but its condition may be checked by other conditionals to see if the turniut is aligned OK.

Conditional System Name IX:S5:SC:C5

Conditional User Name Switch 5 RN

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	Delete
	Sensor Inactive	IS:S5:CL	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
AND NOT	Sensor Active	IS:S5:RI	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type None

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type None

Update Conditional Cancel Delete Conditional



CTC Logix

- Logix
 - Next we will look at the switch control levers.
 - There are a series of conditionals.
 - Send Reverse
 - Send Normal
 - Feedback
 - In motion
 - Aligned

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:S5:SC:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:S5:SC:C1	Switch 5 Send Reverse	False	Edit
DX:S5:SC:C2	Switch 5 Send Normal	False	Edit
DX:S5:SC:C3	Switch 5 Thrown Feedback	False	Edit
DX:S5:SC:C4	Switch 5 Closed Feedback	True	Edit
DX:S5:SC:C5	Switch 5 RN	False	Edit
DX:S5:SC:C6	Switch 5 NR	False	Edit
DX:S5:SC:C7	Switch 5 consistent	True	Edit

New Conditional Reorder Calculate

Done Delete Logix



Conditionals

In corraspondance

IF (Expression)

- False Switch 5 NR
- False Switch 5 RN

THEN (Action)

- 1. No action

Note:

This conditional checks the previous two and by elimination assumes that the turnout is now aligned OK. This conditional may be checked by others that need to know that Sw5 is OK.

Conditional System Name IX:55:SC:C7

Conditional User Name Switch 5 consistent

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
	Conditional False	Switch 5 NR	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
AND	Conditional False	Switch 5 RN	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type None

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type None

Update Conditional Cancel Delete Conditional



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:INIT:	Plant 8 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:ITD:	8 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:MTD:	8 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:PTD:	8 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SH:	Plant 8 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SI:	Plant 8 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SL:	Plant 8 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SND:	Plant 8 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:OS:	Switch 11 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:SC:	Switch 11 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:OS:	Switch 5 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:SC:	Switch 5 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:OS:	Switch 7 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:SC:	Switch 7 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:OS:	Switch 9 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:SC:	Switch 9 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:TRA:IN:	Off panel traffic	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.
 - There are two sets of OS conditions.

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:SS:OS:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:SS:OS:C1	OS 5 Main	False	Edit
DX:SS:OS:C2	OS 5 Passing	False	Edit

New Conditional Reorder Calculate

Done Delete Logix



- There are two OS conditionals, Main and Passing.
 - At first glance 'OS occupied' seems like a simple concept. Things get more complex in real life. If you are on the single track (intermediate track) then the OS is always considered part of the single track block for occupancy. I.e. the single track is not clear until the adjacent OS is also clear.

However, if you are on the main or passing sidings, then things are more complex. The OS is only considered to be a part of the block when the turnout is aligned to include the OS. I.e. If a train is on the OS it only 'occupies' the block/s that the OS turnout aligns with. It does not occupy the other siding.

This is because a 'block' includes all the track between a signal and the next opposing signal, but the OS itself is interspaced between the two sets of signals.



Conditionals

OS Main

IF (Expression)

- LT5 (The turnout is Closed)
- LS2 (The sensor is active)

THEN (Action)

1. Set IS:S5:OSM active if change to true
2. Set ISS5:OSM to inactive if change to false.

Conditional System Name IX:S5:OS:C1

Conditional User Name OS 5 Main

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
	Turnout Closed	LT5	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
AND	Sensor Active	LS2	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Set Sensor IS:S5:OSM Active

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Set Sensor IS:S5:OSM Inactive

Update Conditional Cancel Delete Conditional



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.
 - Next we go to the signal levers.

System...	User Name	Enabled	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:INIT:	Plant 8 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:ITD:	8 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:MTD:	8 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:PTD:	8 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SH:	Plant 8 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SI:	Plant 8 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SL:	Plant 8 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SND:	Plant 8 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:OS:	Switch 11 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:SC:	Switch 11 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:OS:	Switch 5 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:SC:	Switch 5 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:OS:	Switch 7 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:SC:	Switch 7 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:OS:	Switch 9 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:SC:	Switch 9 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:TRA:IN:	Off panel traffic	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.
 - Next we go to the signal levers.
 - There are two physical positions, (but three logical positions) plus the central 'Signals Normal' (stop)

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name IX:P6:SL:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
IX:P6:SL:C1	Set 6 Clear L	False	Edit
IX:P6:SL:C2	Set 6 Clear Main R	False	Edit
IX:P6:SL:C3	Set 6 Clear Pass R	False	Edit

New Conditional Reorder Calculate

Done Delete Logix



Conditionals

Set Clear Left

IF (Expression)

- IS:P6:CB Code Button
- IS:P6:SLL Signal Lever Left
- NOT IS:S5:ITR Indicate Traffic R
- NOT IS:S5:SLI Signal Left Ind.
- NOT IS:S5:SRI Signal Right Ind.

THEN (Action)

1. Trig IR:P6:SO All Indicators 'Off'
2. Set IS:P6:SLR Stack Left Register

Conditional System Name IX:P6:SL:C1

Conditional User Name Set 6 Clear L

Logical Expression

State Variables (max 20)

		Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
		Sensor Active	IS:P6:CB	N/A	N/A	False	<input checked="" type="checkbox"/>	D
AND		Sensor Active	IS:P6:SLL	N/A	N/A	False	<input type="checkbox"/>	D
AND	NOT	Sensor Active	IS:S5:ITR	N/A	N/A	True	<input type="checkbox"/>	D
AND	NOT	Sensor Active	IS:P6:SLI	N/A	N/A	True	<input type="checkbox"/>	D
AND	NOT	Sensor Active	IS:P6:SRI	N/A	N/A	True	<input type="checkbox"/>	D

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Trigger Route IR:P6:SO

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Delayed Set Sensor IS:P6:SLR Active 5

Update Conditional Cancel Delete Conditional



■ Stacking Trains (Follow-on traffic)

- CTC allows the operator to send multiple trains into the same single track as long as they are following one another. He really has no way to tell how far any train has progressed because the underlying ABS is controlling the train spacing. Once a train enters the OS, the signals normal light comes on. (and the OS bell rings, if it is not cut off)

Once the OS has cleared, the operator may allow another train to follow the first, by realigning the switch, if necessary, and then pressing the code button once again. The signals normal will go off as before, but all traffic indicators will remain off until the original train has proceeded far enough to let the ABS clear (Usually to approach) the head block single track signal, which allows the next train to proceed. At that point a directional 'clear' indicator will light again, letting the operator know the next train may follow the first. When the following train enters the OS the OS bell will sound again, etc.



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.
 - Next we go to the signal levers.
 - Then Signal Indicators

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:INIT:	Plant 8 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:ITD:	8 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:MTD:	8 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:PTD:	8 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SH:	Plant 8 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SI:	Plant 8 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SL:	Plant 8 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SND:	Plant 8 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:OS:	Switch 11 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:SC:	Switch 11 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:OS:	Switch 5 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:SC:	Switch 5 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:OS:	Switch 7 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:SC:	Switch 7 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:OS:	Switch 9 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:SC:	Switch 9 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:TRA:IN:	Off panel traffic	<input checked="" type="checkbox"/>	Delete	Edit

Add ...



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.
 - Next we go to the signal levers.
 - Then Signal Indicators
 - Several ways to set 'Signals Normal'

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:P6:SI:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:P6:SI:C1	6 OS Sets Signals Normal from L	False	Edit
DX:P6:SI:C2	6 OS Sets Signals Normal from R	False	Edit
DX:P6:SI:C3	6 Lever N sets Signals Normal	False	Edit
DX:P6:SI:C4	Unstack 6L	False	Edit
DX:P6:SI:C5	Unstack 6R	False	Edit
DX:P6:SI:C6	6 Set Signals Normal from lever L	False	Edit
DX:P6:SI:C7	6 Set Signals Normal from lever R	False	Edit
DX:P6:SI:C8	6 Set Signals Normal Lap Conflict Main	False	Edit
DX:P6:SI:C9	6 Set Signals Normal Lap Conflict Pass	False	Edit
DX:P6:SI:C10	6 Set Signals Normal Lap Conflict Int	False	Edit

New Conditional Reorder Calculate

Done Delete Logix

Conditionals



Set Signals Normal

IF (Expression)

- IS:S5:OSI **OS** Indicator
- IS:P6:SLI **Signal** Left Indicator

THEN (Action)

- 1. Set IS:P6:SNI **Signals** Normal Indicator

Conditional System Name IX:P6:SI:C1

Conditional User Name 6 OS Sets Signals Normal from L

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
	Sensor Active	IS:S5:OSI	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
AND	Sensor Active	IS:P6:SLI	N/A	N/A	False	<input type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Set Sensor IS:P6:SNI Active

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type None

Update Conditional Cancel Delete Conditional

Conditionals



Set Signals Normal

IF (Expression)

- IS:P6:CB Code Button
- IS:P6:SNL Signal Normal Lever
- NOT IS:P6:SNI Signal Normal Indicator

THEN (Action)

- 1. Trig IR:P6:SO Signals Off
- Delay set IS:P6:SNI Signals Normal Ind.

Conditional System Name IX:P6:SI:C3

Conditional User Name 6 Lever N sets Signals Normal

Logical Expression

State Variables (max 20)

		Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
		Sensor Active	IS:P6:CB	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
AND		Sensor Active	IS:P6:SNL	N/A	N/A	False	<input type="checkbox"/>	Delete
AND	NOT	Sensor Active	IS:P6:SNI	N/A	N/A	True	<input type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Trigger Route IR:P6:SO

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Delayed Set Sensor IS:P6:SNI Active 10

Update Conditional Cancel Delete Conditional



■ Setting Signals Normal with the lever.

This is one operation that will get you negative comments. It means you changed your mind about an action, and are about to drop a stop signal in the face of a moving train. The prototype will impose a long delay at this point to allow the train to proceed to the next signal (in case he already passed the signal you just dropped to red) and also time enough for him to stop when he sees the next red. (possibly running past it)

Only after the delay has timed out will the 'Signals Normal' indicator light again and allow for any changes in turnout position or traffic direction, and then only if the any trains are safely stopped short of the OS.

Prototype delays can be from 2-10 minutes. We used 10 seconds here. Modelers would not put up with a prototypical delay without spending the time forming a lynch mob for the dispatcher.



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.
 - Next we go to the signal levers.
 - Then Signal Indicators
 - Several ways to set 'Signals Normal'
 - Unstack traffic

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:P6:SI:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:P6:SI:C1	6 OS Sets Signals Normal from L	False	Edit
DX:P6:SI:C2	6 OS Sets Signals Normal from R	False	Edit
DX:P6:SI:C3	6 Lever N sets Signals Normal	False	Edit
DX:P6:SI:C4	Unstack 6L	False	Edit
DX:P6:SI:C5	Unstack 6R	False	Edit
DX:P6:SI:C6	6 Set Signals Normal from lever L	False	Edit
DX:P6:SI:C7	6 Set Signals Normal from lever R	False	Edit
DX:P6:SI:C8	6 Set Signals Normal Lap Conflict Main	False	Edit
DX:P6:SI:C9	6 Set Signals Normal Lap Conflict Pass	False	Edit
DX:P6:SI:C10	6 Set Signals Normal Lap Conflict Int	False	Edit

New Conditional Reorder Calculate

Done Delete Logix



Conditionals

Unstack 6 Left

IF (Expression)

- IS:P6:SLR Stack Left Register
- IS:S5:OSI OS Indicator
- IX:S5:SC:C7 Switch Control (Consistent)
- NOT LS1 (block)

THEN (Action)

- Set IS:P6:SLI Signals Left Indicator
- Delay set inactive IS:P6:SLR Stack Left Register

Conditional System Name IX:P6:SI:C4

Conditional User Name Unstack 6L

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
	Sensor Active	IS:P6:SLR	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
AND	Sensor Inactive	IS:S5:OSI	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
AND	Conditional True	IX:S5:SC:C7	N/A	N/A	True	<input checked="" type="checkbox"/>	Delete
AND NOT	Sensor Active	LS1	N/A	N/A	True	<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Set Sensor IS:P6:SLI Active

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Delayed Set Sensor IS:P6:SLR Inactive 1

Update Conditional Cancel Delete Conditional



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.
 - Next we go to the signal levers.
 - Then Signal Indicators
 - Several ways to set 'Signals Normal'
 - Unstack traffic
 - Conflict resolution due to simultaneous conflicting moves

System...	User Name	Enabled		
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Dire...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name DX:P6:SI:
Logix User Name Plant 6 Signal Indicators

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	
DX:P6:SI:C1	6 OS Sets Signals Normal from L	False	Edit
DX:P6:SI:C2	6 OS Sets Signals Normal from R	False	Edit
DX:P6:SI:C3	6 Lever N sets Signals Normal	False	Edit
DX:P6:SI:C4	Unstack 6L	False	Edit
DX:P6:SI:C5	Unstack 6R	False	Edit
DX:P6:SI:C6	6 Set Signals Normal from lever L	False	Edit
DX:P6:SI:C7	6 Set Signals Normal from lever R	False	Edit
DX:P6:SI:C8	6 Set Signals Normal Lap Conflict Main	False	Edit
DX:P6:SI:C9	6 Set Signals Normal Lap Conflict Pass	False	Edit
DX:P6:SI:C10	6 Set Signals Normal Lap Conflict Int	False	Edit

New Conditional Reorder Calculate
Done Delete Logix



■ Conflicting moves (overlaped traffic direction)

It is possible to setup conflicting moves on a CTC machine, especially with boundry traffic where both operators may simultaneously choose to send opposing traffic on the single track that joins two districts. The code traffic delays involved leave a gap between the sending of a signal and the registering of that information in the next CTC machine.

This conflict resolution Logix immediately detects these conflicts once they appear, and restors all the signals to stop, and then imposes a timout delay for any traffic that has responded to the brief signal flash.

A single operator should not setup traffic that conflicts with himself. Phone or radio communications with adjoining districts should prevent these conflicts in the first place. In either case the machine detects the errors and locks the signals back to stop long enough to resolve them.



CTC Logix

- Logix
 - Now we will look at some details of the OS sections.
 - Next we go to the signal levers.
 - Then Signal Indicators
 - Finally Signal Heads

System...	User Name	Enabled	Delete	Edit
DX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:ITD:	6 Intermediate Traffic Direction	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SH:	Plant 6 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SI:	Plant 6 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SL:	Plant 6 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P6:SND:	Plant 6 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:INIT:	Plant 8 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:ITD:	8 Intermediate Traffic Directi...	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:MTD:	8 Main Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:PTD:	8 Passing Traffic Direction L	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SH:	Plant 8 Signal Heads	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SI:	Plant 8 Signal Indicators	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SL:	Plant 8 Signal Lever	<input checked="" type="checkbox"/>	Delete	Edit
DX:P8:SND:	Plant 8 Sounds	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:OS:	Switch 11 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S11:SC:	Switch 11 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:OS:	Switch 5 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S5:SC:	Switch 5 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:OS:	Switch 7 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S7:SC:	Switch 7 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:OS:	Switch 9 OS	<input checked="" type="checkbox"/>	Delete	Edit
DX:S9:SC:	Switch 9 Control	<input checked="" type="checkbox"/>	Delete	Edit
DX:TRA:IN:	Off panel traffic	<input checked="" type="checkbox"/>	Delete	Edit



CTC Logix

■ Logix

- Now we will look at some details of the OS sections.
- Next we go to the signal levers.
- Then Signal Indicators
- Finally Signal Heads
 - Each signal is set by the ABS logic (SSL) in the Plant. The CTC over-rides the normal ABS with 'Hold.'

System...	User Name	Enabled	Delete	Edit
IX:P2:INIT:	Plant 2 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P4:INIT:	Plant 4 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:INIT:	Plant 6 Initialization	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:ITD:	6 Intermediate Traffic Direction	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:MTD:	6 Main Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit
IX:P6:PTD:	6 Passing Traffic Direction R	<input checked="" type="checkbox"/>	Delete	Edit

Logix System Name IX:P6:SH:

Logix User Name

Conditionals (in Order of Calculation, max 50)

System Name	User Name	State	Edit
IX:P6:SH:C1	LH1 Hold	False	Edit
IX:P6:SH:C2	LH2 Hold	False	Edit
IX:P6:SH:C3	LH3 Hold	False	Edit
IX:P6:SH:C4	LH4 Hold	False	Edit
IX:P6:SH:C5	IH1 Hold	False	Edit
IX:P6:SH:C6	IH2 Hold	False	Edit
IX:P6:SH:C7	Plant 6 Main Occupied R	False	Edit
IX:P6:SH:C8	Plant 6 Pass Occupied R	False	Edit

New Conditional Reorder Calculate

Done Delete Logix

Conditionals



LH1 Hold

IF (Expression)

- IS:P6:SRI Signal Right Indicator
- LT5 Turnout 5 position

THEN (Action)

1. Clear LH1 Signal Head 1 hold on change to true
2. Set LH1 Signal Head 1 to hold on change to false

Conditional System Name IX:P6:SH:C1

Conditional User Name LH1 Hold

Logical Expression

State Variables (max 20)

	Variable Type	Name	Data 1	Data 2	State	Triggers Cal...	
	Sensor Active	IS:P6:SRI	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete
AND	Turnout Thrown	LT5	N/A	N/A	False	<input checked="" type="checkbox"/>	Delete

Add State Variable Check State Variables

Actions

Action 1 - Trigger Action On Change To True On Change To False On Change

Action 1 - Type Clear Signal Held LH1

Action 2 - Trigger Action On Change To True On Change To False On Change

Action 2 - Type Set Signal Held LH1

Update Conditional Cancel Delete Conditional



- What we have covered so far:
 - CTC Panel operation detail (CTC-clinic-1)
 - CTC Panel Logix (CTC-clinic-2)
- Where we are going next:
 - CTC Prototype Panel (CTC-clinic-3)