

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

Repeated 4:00 PM, Friday, July 10th





- CTC Centralized Traffic Control
 - According to Wikipedia Centralized Traffic Control (CTC) is a signalling system used by railroads. The system consists of a centralized train dispatcher's office that controls railroad switches in the CTC territory and the signals that railroad engineers must obey in order to keep the traffic moving safely and smoothly across the railroad.
 - CTC systems are considered sufficient authority to run trains based strictly on signal indications. This is because CTC signals default to 'Stop' and require a human dispatcher to 'Clear' them.
 - The CTC panel depicted in this clinic is a Classic era US&S panel.





- CTC basics
 - ABS defaults to 'Clear' signals, and drops to 'Stop' if the block immediately beyond the signal is occupied, or if the switch (turnout) beyond the signal is set against the direction of traffic.





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- CTC is a layer superimposed over the basic ABS system to hold all signals in the 'Stop' aspect unless cleared by the dispatcher to their ABS value. This means that the local ABS logic will always (normally) supercede in the lower speed aspect. I.e. The dispatcher does NOT actually set the signals to green. He just permits them to go green.





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- 'Clear' to the dispatcher means proceed, one way only. 'Normal' to the dispatcher is all signals at stop.





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 - This clinic assumes that you understand the ABS signal system previously covered because that is the basis for the CTC operation.





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 - We will attempt to cover the basic steps required for the CTC panel, continuing from where we left off with the SSL.
 - The completed 2009Clinic7.xml panel has indicators for all the required logic.
 - The 2009Clinic8.xml panel only includes prototypical indications, other than the traffic simulation toggles.





CTC

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- Open the Panel Editor and select 'Add Multisensor'.



File Window File Window Add MultiSe Find Icons W To add these Ico Drag Sensors f Sensor: undefined Delet	6 Editor Help ensor (2009 Clir findow Help cons to the Par from table into Position 1 u te Inconsis	nic 6) nel, the red boxes, then pr Sensor: Position 2 indefined Delete	ress Add To Panel Sensor:Position 3 undefined Delete
	X		0
Systen IS6:CB	n Name	Use	r Name
IS6:LDGL IS6:RDGL IS6:RGL IS6:TAK IS6:TBK	•		
		Right Left Add (another Icon

CTC

- This panel is the one we left with at the end of the SSL section. It has relay sounds and delays between the block sensors and the panel indicators.
- Open the Panel Editor and select 'Add Multisensor'.
- Drag the system items to the correct icon for each lever position, then click ;Add to Panel'.



CTC

 Note: Here is the image showing all the variable names for Plant 5-6



-		
2009	9 Clinic 7	
Edit	Marker Window Help	
	2009 Clinic 6 Editor File Window Help Edit MultiSensor To add these Icons to the Panel, Drag Sensors from table into the red boxes, then press Add To Panel Sensor. Position 1 Sensor. Position 1 IS6:LDGL Delete Delete Inconsistent Unknown Inactive	
	System Name User Name	
×	IS5:WL IS6:CB IS6:LDGL IS6:RDGL	
	IS6:TAK	
	O Up - Down Right - Left Add Another Icon	
	Add to Panel Change icon	
	Add item to table	

- This panel is the one we left with at the end of the SSL section. It has relay sounds and delays between the block sensors and the panel indicators.
- Open the Panel Editor and select 'Add Multisensor'.
- Drag the system items to the correct icon for each lever position, then click ;Add to Panel'.
- Do the same for all 4 signal levers.





CTC basics

 Now add the signal indicator lamps. Select 'Add Sensor' and set the icons to green jewels.





- Now add the signal indicator lamps. Select 'Add Sensor' and set the icons to green jewels.
- Then add: IS6:LDGK
 (Plant 6: Left proceeD siGnal indiKtor) and IS6:RDGK (Plant 6: Right proceeD siGnal indiKtor)





- Now add the signal indicator lamps. Select 'Add Sensor' and set the icons to green jewels.
- Then add: IS6:LDGK (Plant 6: Left proceeD siGnal indiKtor) and IS6:RDGK (Plant 6: Right proceeD siGnal indiKtor)
- Move them into position.







- Now add the signal indicator lamps. Select 'Add Sensor' and set the icons to green jewels.
- Then add: IS6:LDGK (Plant 6: Left proceeD siGnal indiKtor) and IS6:RDGK (Plant 6: Right proceeD siGnal indiKtor)
- Move them into position.
- And repeat for plant 8, 10, and 12.





- Now add the signal indicator lamps. Select 'Add Sensor' and set the icons to green jewels.
- Then add: IS6:LDGK (Plant 6: Left proceeD siGnal indiKtor) and IS6:RDGK (Plant 6: Right proceeD siGnal indiKtor)
- Move them into position.
- And repeat for plant 8, 10, and 12.
- Now change the icons to red jewels.





CTC basics

 Then add: IS6:NGK (Plant 6: Normal siGnal indiKtor)





- Then add: IS6:NGK (Plant 6: Normal siGnal indiKtor)
- Move it into position.





- Then add: IS6:NGK (Plant
 6: Normal siGnal indiKtor)
- Move it into position.
- And repeat for plant 8, 10, and 12.



📇 Logix Table				
File Window Hel	p <u>O</u> ptions			
System Name /	User Name	Enabled	Comment	
IX4:TK	Plant 4 TK Indicator			Select
IX5:TK	Plant 5 OS Indicator			Select
IX5:WC	Plant 5 Switch Controller	J		Select
IX5:WK	Plant 5 Switch Indicator			Select
IX6:TAK	Plant 6 TAK Indicator	V		Select
IX6:TBK	Plant 6 TBK Indicator			Select
IX7:TK	Plant 7 OS Indicator	V		Select
IX7:WC	Plant 7 Switch Controller			Select
IX7:WK	Plant 7 Switch Indicator			Select
IX8:TK	Plant 8 TK Indicator			Select
IX9:TK	Plant 9 OS Indicator			Select
IX9:WC	Plant 9 Switch Controller			Select
IX9:WK	Plant 9 Switch Indicator	V		Select
IX10:TAK	Plant 10 TAK Indicator			Select
IX10:TBK	Plant 10 TBK Indicator			Select
IX11:TK	Plant 11 OS Indicator			Select
IX11:WC	Plant 11 Switch Controller			Select
IX11:WK	Plant 11 Switch Indicator			Select
IX12:TK	Plant 12 TK Indicator	V		Select
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Add	Element Name		Find Ornhane	Empty Cond'ls
	Get References		Critic orphans	
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FC basics

- Then add: IS6:NGK (Plant
 6: Normal siGnal indiKtor)
- Move it into position.
- And repeat for plant 8, 10, and 12.
- Open the Logix table



🐴 Logix Table				
File Window Help	o <u>O</u> ptions			
System Name /	User Name	Enabled	Comment	
IX4:TK	Plant 4 TK Indicator			Select
IX5:TK	Plant 5 OS Indicator			Select
IX5:WC	Plant 5 Switch Controller	V		Select
IX5:WK	Plant 5 Switch Indicator	V		Select
IX6:TAK	Plant 6 TAK Indicator			Select
IX6:TBK	Plant 6 TBK Indicator			Select
IX7:TK	Plant 7 OS Indicator	V		Select
IX7:WC	Plant 7 Switch Controller			Select
IX7:WK	Plant 7 Switch I	gix		Select
IX8:TK	Plant 8 TK Indic Window	Help		Select
IX9:TK	Plant 9 OS Indic	and any blocks	170.00	Select
IX9:WC	Plant 9 Switch C	ystem Name	IX0.GC	Select
IX9:WK	Plant 9 Switch II Logix I	User Name	Plant 6 Signal Contr	Select
IX10:TAK	Plant 10 TAK In			Select
IX10:TBK	Plant 10 TBK In	iter system na	me and user name, then	Select
IX11:TK	Plant 11 OS Ind Click C	reate Logix, th	en add Conditionals.	Select
IX11:WC	Plant 11 Switch	Cancel	Create Logix	Select
IX11:WK	Plant 11 Switch			Select
IX12:TK	Plant 12 TK Indicator	V		Select
Add	Element Nan Get References	le	Find Orphans	Empty Cond'Is
		100000000		

C basics

- Then add: IS6:NGK (Plant
 6: Normal siGnal indiKtor)
- Move it into position.
- And repeat for plant 8, 10, and 12.
- Open the Logix table
- Add IX6:GC (Plant 6 siGnal Control

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Kindow Help	
Logix System Name IX6:GC	
Logix User Name Plant 6 Signal Control	Select I C DASICS
	Select
Conditionals (in Order of Calculation)	select Then add: IS6:NGK (Plant
System Name User Name State	Select 6: Normal siGnal
	Select indiktor)
	Select IIICII (UII)
	Select Move it into position
	Select
	Select And repeat for plant 8 10
	Select and 12
	Select and 12.
	select
	Select Open the Logix table
	Select Add IX6.CC (Plant 6
	Select SiGnal Control
	Select Click New Conditional
	Select
New One different	Empty Cond'Is
New Conditional Reorder Calculate	
Done Delete Logix	

	СТ	C
Edit Conditional		
Window Help		
Conditional System Name IX6:GCC1 Conditional User Name 6GC Sound	-	TC basics
Logical Expression: Antecedent Variables (the 'if' part) Row Oper Neg State Variable Description State		 Then add: IS6:NGK (Plant 6: Normal siGnal indiKtor)
		 Move it into position.
Add State Variable Check State Variables		 And repeat for plant 8, 10, and 12.
Logic Operator		 Open the Logix table
Actions Consequent Actions (the "then' part) Action Description		 Add IX6:GC (Plant 6 siGnal Control
		 Click 'New Conditional'
		and name it 6GC Sound then 'Add State Variable'
Add Action Reorder		
Update Conditional Cancel Delete Conditional		

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Conditional System Name IX6:GCC1 Conditional User Name 6GC Sound	FC basics
Logical Expression: Antecedent Variables (the 'if part) Row Oper Neg State Variable Description State Trigge Edit Variable Antecedent Variable	 Then add: IS6:NGK (Plant 6: Normal siGnal indiKtor)
Variable Type System / User Name	 Move it into position.
Sensor Active IS6:NGL Update Cancel Delete	• And repeat for plant 8, 10, and 12.
	Open the Logix table
Actions Consequent Actions (the "then' part) Action Description	Add IX6:GC (Plant 6 siGnal Control
	Click 'New Conditional'
	 and name it 6GC Sound then 'Add State Variable'
Add Action Reorder	Sensor Active' IS6:NGL
	and Opuale Conditional.

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🚆 Edit Conditional	
Window Help	
Conditional System Name IX6:GCC1	CTC basics
Conditional User Name 6GC Sound	010 003103
Logical Expression:	
Antecedent Variables (the 'if part)	 What we are doing is
Row Oper Neg State Trigge D1 D1 D1 D1 D1 D1	adding sound to the lever
R1 Sensor, ISb.NGL, for Sensor Active Faise Edit Delete	action
Add State Variable Check State Variables Logic Operator	
Actions	
Consequent Actions (the 'then' part)	
Action Description Add Action Reorder	
Update Conditional Cancel Delete Conditional	



Edit Condition	nal						- 0 X	
Window Hel	lp							
		Condition	ial System Name IX	6:GCC1				ſ
		Conditional User Name	6GC Sound					
Logical Expres	sion:							
		Anteced	dent Variables (the 'i	f part)				
Row Oper	Neg	State Variable Description		State	Trigge			
R1		Sensor, IS6:NGL, for Sensor	Active	False	•	Edit	Delete	
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		Upda	ite Cance	el De	lete			
		Consequ	ient Actions (the "the	en' part)				
Action Descri	ption							
		Add	d Action Reord	er				
		Update Conditional	Cancel	Delete Conditi	onal			

- What we are doing is adding sound to the lever action.
 - 'Play Sound File' on 'Change to False' the 'Signal-lever'



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Wind	dow	Help)							
				Condition	nal System Name IX6:(GCC1				
				Conditional User Name	6GC Sound					
Logic	alEx	nress	ion.							
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1				Antecer	dent vanables (the in p					
Ro	N (Oper	Neg	State Variable Description	1014-110-1	State	Trigge	-		-
R1				Sensor, IS6:NGL, for Sensor	Active	False	\checkmark	Edit	Delete	
				Add State Vari	able Check State	Variables	1			
					Logic Operator					
					AND					
Actio	ns									
				Consequ	uent Actions (the "then"	part)				
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-										_1
				Add	d Acti Reorder					
				Update Conditional	Cancel De	lete Conditio	onal			
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- What we are doing is adding sound to the lever action.
- 'Play Sound File' on 'Change to False' the 'Signal-lever'
- We also need to play the sound of the lever restoring to normal.



Edit Condition	al						
Nindow Help	þ						
		Conditional System N	ame IX6:GCC1				
		Conditional User Name 6GC Sour	d				
ogical Express	ion:						-
		Antecedent Variabl	es (the 'if part)				
Row Oper	Neg	State Variable Description	State	Trigge			
R1		Sensor, IS6:NGL, for Sensor Active	False		Edit	Delete	
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		Action Type	C	Change O	ption		
	6	Play Sound File	On C	hange To	True 🔻	1	
20020	C					,	
Set File			Action Data				
File	res	ources\sounds\Signal-normal.wa	av 🚽				
		Update	Cancel De	lete			
		Add Action	Reorder				
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- What we are doing is adding sound to the lever action.
- 'Play Sound File' on 'Change to False' the 'Signal-lever'
- We also need to play the sound of the lever restoring to normal.
 - 'Play Sound File' on 'Change to True' the 'Signal-normal'



Edit Condition	nal			-					
Window Hel	р								
			Condition	nal System Nam	e IX6:GCC1				
		Conditional U	Jser Name	6GC Sound					
	alam					17			
Logical Express	sion:								
			Antece	dent Variables (1	the 'if' part)				
Row Oper	w Oper Neg State Variable Description State Trigge								
R1		Sensor, IS6:NGL,	for Sensor	Active	False		Edit	Delete	
Actions		Ad	ld State Vari	iable Chec Logic Operato AND V	k State Variables	1			
Activity			Consequ	uent Actions (the	'then' part)				
Action Descrip	otion								7
On Change T	o False, I	Play Sound File from	n file, resour	rces\sounds\Sig	nal-lever.wav.		Edit	Delete	1
On Change T	o True. P	lay Sound File from	file, resourc	:es\sounds\Siar	al-normal.wav.		Edit	Delete	
			Ad	d Action	Sorder				
		Update	Conditional	Cancel	Delete Conditio	nal			

- What we are doing is adding sound to the lever action.
- 'Play Sound File' on 'Change to False' the 'Signal-lever'
- We also need to play the sound of the lever restoring to normal.
- 'Play Sound File' on
 'Change to True' the
 'Signal-normal'
- 'Update Conditional' and we should have sound on the lever.

				СТ	C
Window Help	Logix System Nam	e IX6:GC		C	TC basics
Logix Table					
File Window Help	<u>O</u> ptions				
System Name 🗸	User Name	Enabled	Comment		• Now copy the Logix for
IX4:TK	Plant 4 TK Indicator	V		Select	IS8:GC, IS10:GC, and
IX5:TK	Plant 5 OS Indicator	V		Select	
IX5:WC	Plant 5 Switch Controller	\checkmark		Select	1512:60.
IX5:WK	Plant 5 Switch Indicator	\checkmark		Select	
IX6:GC	Plant 6 Signal Controller	V		Select	
IX6:TAK	Plant 6 TAK Indicator	V		Select	
IX6:TBK	Plant 6 TBK Indicator	V		Select	
IX7:TK	Plant 7 OS Indicator	V		Select	
IX7:WC	Plant 7 Switch Controller	V		Select	
IX7:WK	Plant 7 Switch Indicator	V		Select	
IX8:TK	Plant 8 TK Indicator	V		Select	
IX9:TK	Plant 9 OS Indicator	V		Select	
IX9:WC	Plant 9 Switch Controller	\checkmark		Select	
IX9:WK	Plant 9 Switch Indicator	\checkmark		Select	
IX10:TAK	Plant 10 TAK Indicator	\checkmark		Select	
IX10:TBK	Plant 10 TBK Indicator			Select	
IX11:TK	Plant 11 OS Indicator	\checkmark		Select	
IX11:WC	Plant 11 Switch Controller	\checkmark		Select	
IX11:WK	Plant 11 Switch Indicator	V		Select	
-	Element Name	•			
	Get References		Find Orphans	Empty Cond'Is	



Logix Table				
File Window	Help <u>O</u> ptions			
ystem Name /	User Name	Enabled	Comment	
(4:TK	Plant 4 TK Indicator			Select
(5:TK	Plant 5 OS Indicator	\checkmark		Select
(5:WC	Plant 5 Switch Controller			Select
(5:WK	Plant 5 Switch Indicator			Select
(6:GC	Plant 6 Signal Controller			Select
(6:TAK	Plant 6 TAK Indicator	V		Select
(6:TBK	Plant 6 TBK Indicator			Select
(7:TK	Plant 7 OS Indicator			Select
(7:WC	Plant 7 Switch Controller	\checkmark		Select
(7:WK	Plant 7 Switch Indicator	\checkmark		Select
(8:TK	Plant 8 TK Indicator	V		Select
(9:TK	Plant 9 OS Indicator			Select
(9:WC	Plant 9 Switch Controller			Select
(9:WK	Plant 9 Switch Indicator			Select
(10:TAK	Plant 10 TAK Indicator	\checkmark		Select
(10:TBK	Plant 10 TBK Indicator			Select
(11:TK	Plant 11 OS Indicator			Select
(11:WC	Plant 11 Switch Controller	v		Select
(11:WK	Plant 11 Switch Indicator			Select
<u> </u>				
	Element Nar	me		

- Now copy the Logix for IS8:GC, IS10:GC, and IS12:GC.
- Then edit each entry to reflect the required new values.





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CTC bell

- Now copy the Logix for IS8:GC, IS10:GC, and IS12:GC.
- Then edit each entry to reflect the required new values.
- Go back to our panel. The CTC panel had a bell that rang every time a train entered an OS section. This was to alert the dispatcher of train movements in case he was away from the panel. However he was able to disable the bell.




- Start by adding a plate for the bell cutout switch.
 'Add Icon (plain)'
- Navigate to 'icons USS plate – misc' and drag the
 'bell-cutout' image to the icon position, then 'Add to Panel'







- Start by adding a plate for the bell cutout switch.
 'Add Icon (plain)'
- Navigate to 'icons USS plate – misc' and drag the 'bell-cutout' image to the icon position, then 'Add to Panel'
- Move it into position near the bottom of the panel.



2009 Clinic 7			
Edit Marker Window	Help		
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	2009 Clinic 7 Editor 📃 🗖 🗙	J	
	File Window Help		Select
	x: 0 y: 0		Select
			Select
	Set panel name		Select
	Add text	00	Select
	Addient		Select
	Select the type of icon to Add to panel		Select
			Select
0000	Panel items popup menus active	LO.	Select
8 8	☑ All panel items can be repositioned		Select
	Show item's coordinates in popup menu		Select
21.24	Panel items control layout	1 April	Select
ouve			Select
5 5	Panel has menu	6	Select
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CUTOUT	MAAV/ACTIRCD BY		
	UNION SWITCH & SICHAL DE DYNAMINGER SIGNER REFERENCE IN REFERENCE IN		
			Empty Cond'Is

Get References

- Start by adding a plate for the bell cutout switch.
 'Add Icon (plain)'
- Navigate to 'icons USS plate – misc' and drag the 'bell-cutout' image to the icon position, then 'Add to Panel'
- Move it into position near the bottom of the panel.
- Now select 'Add Sensor' and set the icon image to be a toggle switch.



1.

🛸 2009 Clinic 7		
Edit Marker Window Help		
Add Sensor (2009 Clinic 7) 📃 🗖 🗶	
Find Icons	Window Help	
To add these Ico	ns to the Panel,	Select
Select Sensor fro	om table, then press Add To Panel	Select
		Select
	* <u>9</u>	Select
	known Inconsistant	Select
		Select
	3 8	Select
		Select
System Name	User Name	Select
ISCLOCKRON		Select
IS5:NWK		Select
IS5:RWK	1000	Select
IS5:WL		Select
		Select
Add to F	'anel Change icon	Select
5 5 F		Select
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Get Referen	es	

- Start by adding a plate for the bell cutout switch.
 'Add Icon (plain)'
- Navigate to 'icons USS plate – misc' and drag the 'bell-cutout' image to the icon position, then 'Add to Panel'
- Move it into position near the bottom of the panel.
- Now select 'Add Sensor' and set the icon image to be a toggle switch.
- Add a sensor IS:AXR
 (Approach Bell Relay).





and the states			
Edit	Marker	Window	Help

File Wildow H	elp <u>O</u> ptions		
System Name 🚈	User Name	Enabled Comment	
X4:TK	Plant 4 TK Indicator		Select
X5:TK	Plant 5 OS Indicator	\checkmark	Select
X5:WC	Plant 5 Switch Controller		Select
X5:WK	Plant 5 Switch Indicator		Select
X6:GC	Plant 6 Signal Controller		Select
X6:TAK	Plant 6 TAK Indicator		Select
X6:TBK	Plant 6 TBK Indicator		Select
X7:TK	Plant 7 OS Indicator		Select
X7:WC	Plant 7 Switch Controller		Select
X7:WK	Plant 7 Switch Indicator		Select
X8:TK	Plant 8 TK Indicator		Select
X9:TK	Plant 9 OS Indicator		Select
X9:WC	Plant 9 Switch Controller		Select
K9:WK	Plant 9 Switch Indicator		Select
X10:TAK	Plant 10 TAK Indicator	I	Select
X10:TBK	Plant 10 TBK Indicator		Select
X11:TK	Plant 11 OS Indicator	\checkmark	Select
X11:WC	Plant 11 Switch Controller		Select
	Plant 11 Switch Indicator		Select

Get References

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- Move the toggle switch into position on the bell cutout plate
- Now add a Logix and call it IX:AXC (Approach Bell Control)



Edit	Marker	Window	Help

Bystem Name User Name Enabled Comment X4:TK Plant 4 TK Indicator Image: Comment Select X5:TK Plant 5 OS Indicator Image: Comment Select X5:WC Plant 5 Switch Controller Image: Comment Select X5:WC Plant 5 Switch Indicator Image: Comment Select X6:GC Plant 6 Signal Controller Image: Comment Select X6:GC Plant 6 Signal Controller Image: Comment Select X6:TAK Plant 6 TAK Indicator Image: Comment Select X6:TAK Plant 6 TBK Indicator Image: Comment Select X6:TK Plant 7 Switch Controller Image: Comment Select X7:WC Plant 7 Switch Indicator Image: Comment Image: Comment X8:TK Plant 8 TK Indicator Logix System Name IX:AXC X9:WC Plant 9 Switch Controller Logix User Name Approach Bell Contr Y9:WK Plant 9 Switch Indicator Logix User Name Approach Bell Contr Y9:WK Plant 9 Switch Indicator Cancel Create Logix Y10:TAK P	ndow Help Options	1			
K4:TK Plant 4 TK Indicator Image: Controller Select K5:TK Plant 5 OS Indicator Image: Controller Select K5:WC Plant 5 Switch Controller Image: Controller Select K5:WK Plant 5 Switch Indicator Image: Controller Select K6:GC Plant 6 Signal Controller Image: Controller Select K6:GC Plant 6 TAK Indicator Image: Controller Select K6:TAK Plant 6 TBK Indicator Image: Controller Select K6:TBK Plant 7 OS Indicator Image: Controller Image: Controller K7:TK Plant 7 OS Indicator Image: Controller Image: Controller K7:WC Plant 7 Switch Indicator Image: Controller Image: Controller K8:TK Plant 8 TK Indicator Image: Controller Image: Controller K9:WC Plant 9 Switch Indicator Logix User Name IX:AXC K10:TAK Plant 10 TAK Indicator Cancel Create Logix, then add Conditionals. K10:TAK Plant 10 TBK Indicator Cancel Create Logix K11:TK Plant 11 0S Indicator Image: Controller <td< td=""><td>me 🚈 User Name</td><td>En</td><td>abled Comm</td><td>ent</td><td></td></td<>	me 🚈 User Name	En	abled Comm	ent	
X5:TK Plant 5 OS Indicator Image: Controller Select X5:WC Plant 5 Switch Controller Image: Controller Select X6:GC Plant 6 Signal Controller Image: Controller Select X6:GC Plant 6 Signal Controller Image: Controller Select X6:GC Plant 6 Signal Controller Image: Controller Select X6:TAK Plant 6 TAK Indicator Image: Controller Select X6:TBK Plant 6 TBK Indicator Image: Controller Select X7:TK Plant 7 OS Indicator Image: Controller Image: Controller X7:WC Plant 7 Switch Controller Image: Controller Image: Controller X8:TK Plant 9 OS Indicator Image: Controller Image: Controller X9:TK Plant 9 OS Indicator Logix User Name Approach Bell Controller X9:WK Plant 9 Switch Indicator Please enter system name and user name, then click Create Logix, then add Conditionals. Cancel Create Logix X10:TAK Plant 10 TAK Indicator Cancel Create Logix Create Logix	Plant 4 TK Indi	cator		Sele	ct
X5:WC Plant 5 Switch Controller Image: Controller Select X6:GC Plant 6 Signal Controller Select X6:TAK Plant 6 TAK Indicator Select X6:TBK Plant 6 TBK Indicator Select X6:TBK Plant 7 OS Indicator Select X7:TK Plant 7 Switch Controller Select X7:WC Plant 7 Switch Controller Mindow X8:TK Plant 9 TS Indicator Select X8:TK Plant 9 OS Indicator User Name X9:WC Plant 9 Switch Indicator Logix User Name X9:WK Plant 10 TAK Indicator Cancel X10:TAK Plant 10 TBK Indicator Cancel X11:TK Plant 10 Sindicator Cancel	Plant 5 OS Indi	cator		Sele	ct
K5:WK Plant 5 Switch Indicator Image: Controller Select K6:GC Plant 6 Signal Controller Image: Controller Select K6:TAK Plant 6 TAK Indicator Image: Controller Select K6:TBK Plant 6 TBK Indicator Image: Controller Image: Controller Select K7:TK Plant 7 OS Indicator Image: Controller Image: Controller Image: Controller Image: Controller K7:WC Plant 7 Switch Indicator Image: Controller Image: Controller <td>Plant 5 Switch</td> <td>Controller</td> <td></td> <td>Selec</td> <td>ct</td>	Plant 5 Switch	Controller		Selec	ct
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X6:TBK Plant 6 TBK Indicator Select X7:TK Plant 7 OS Indicator Add Logix Image: Controller X7:WC Plant 7 Switch Controller Window Help Image: Controller X7:WK Plant 7 Switch Indicator Using System Name IX:AXC X8:TK Plant 8 TK Indicator Logix System Name IX:AXC X9:TK Plant 9 OS Indicator Logix User Name Approach Bell Contr X9:WC Plant 9 Switch Controller Please enter system name and user name, then Click Create Logix, then add Conditionals. X10:TBK Plant 10 TBK Indicator Cancel Create Logix X11:TK Plant 11 OS Indicator Cancel Create Logix	Plant 6 TAK Ind	licator	\checkmark	Sele	ct
X7:TK Plant 7 OS Indicator X7:WC Plant 7 Switch Controller X7:WK Plant 7 Switch Indicator X8:TK Plant 8 TK Indicator X9:TK Plant 9 OS Indicator X9:WC Plant 9 Switch Controller X9:WK Plant 9 Switch Controller X9:WK Plant 9 Switch Controller X10:TAK Plant 10 TAK Indicator X10:TBK Plant 10 TBK Indicator X11:TK Plant 10 S Indicator	Plant 6 TBK Inc	licator		Sele	ct
X7:WC Plant 7 Switch Controller X7:WK Plant 7 Switch Indicator X8:TK Plant 8 TK Indicator X9:TK Plant 9 OS Indicator X9:WC Plant 9 Switch Controller Y9:WK Plant 9 Switch Indicator X10:TAK Plant 10 TAK Indicator X10:TBK Plant 10 TBK Indicator X11:TK Plant 10 S Indicator X11:WC Plant 11 OS Indicator	Plant 7 OS Indi	cator 🗮 Add	Logix		
K7:WK Plant 7 Switch Indicator K8:TK Plant 8 TK Indicator K9:TK Plant 9 OS Indicator K9:WC Plant 9 Switch Controller K9:WK Plant 9 Switch Indicator K10:TAK Plant 10 TAK Indicator K10:TBK Plant 10 TBK Indicator K11:TK Plant 10 S Indicator K11:TK Plant 10 S Indicator	Plant 7 Switch	Controller Wind	ow Help		
K8:TK Plant 8 TK Indicator K9:TK Plant 9 OS Indicator K9:WC Plant 9 Switch Controller K9:WK Plant 9 Switch Indicator K10:TAK Plant 10 TAK Indicator K10:TBK Plant 10 TBK Indicator K11:TK Plant 10 S Indicator K11:TK Plant 11 OS Indicator	Plant 7 Switch	Indicator	x System Name	IX:AXC	
K9:TK Plant 9 OS Indicator K9:WC Plant 9 Switch Controller K9:WK Plant 9 Switch Indicator K10:TAK Plant 10 TAK Indicator K10:TBK Plant 10 TBK Indicator K11:TK Plant 11 OS Indicator	Plant 8 TK Indi	cator	, cjotom rudino		
K9:WC Plant 9 Switch Controller K9:WK Plant 9 Switch Indicator K10:TAK Plant 10 TAK Indicator K10:TBK Plant 10 TBK Indicator K10:TBK Plant 10 TBK Indicator K11:TK Plant 11 OS Indicator K11:WC Plant 11 OS Indicator	Plant 9 OS Indi	cator Log	gix User Name 🛛 A	pproach Bell Contr	
K9:WK Plant 9 Switch Indicator K10:TAK Plant 10 TAK Indicator K10:TBK Plant 10 TBK Indicator K11:TK Plant 11 OS Indicator K11:WC Plant 11 OS Indicator	Plant 9 Switch	Controller		no and upor normal than	
K10:TAK Plant 10 TAK Indicator K10:TBK Plant 10 TBK Indicator K11:TK Plant 11 OS Indicator K11:TK Plant 11 OS Indicator	Plant 9 Switch	Indicator	enter system har	he and user hame, ther	L
K10:TBK Plant 10 TBK Indicator Cancel Create Logix K11:TK Plant 11 OS Indicator Select	Plant 10 TAK In	dicator clic	k Create Logix, the	en add Conditionals.	
X11:TK Plant 11 OS Indicator	Plant 10 TBK In	dicator	Cancel	Create Logix	
(11)//C Blopt 11 Switch Controllor 🛛	Plant 11 OS Inc	dicator			
VII.wo Plant IT switch Controller	Plant 11 Switch	Controller		Selec	ct
X11:WK Plant 11 Switch Indicator 🗹 Select	Plant 11 Switch	Indicator	\checkmark	Selec	ct

- Move the toggle switch into position on the bell cutout plate
- Now add a Logix and call it IX:AXC (Approach Bell Control)
- Create it.



	CTC
Edit Conditional	
Window Help Conditional System Name IX:AXCC1 Conditional User Name Switch Click Logical Expression: Antecedent Variables (the 'if part)	• Move the toggle switch
Row Oper Neg State Variable Description State Trigge	into position on the bell cutout plate
Add State Variables	Now add a Logix and call it IX:AXC (Approach Bell Control)
Logic Operator	Create it.
Actions	• Add a 'New Conditional'.
Consequent Actions (the 'then' part) Action Description	• and call it 'Switch Click'.
Add Action Reorder	
Update Conditional Cancel Delete Conditional	nďis



Edit Conditio	nal						- 0 X	
Window He	lp							
		Condition	al System Name	IX:AXCC1				
		Conditional User Name	Switch Click					
ogical Expres	sion:							
		Anteced	lent Varia <mark>b</mark> les (th	e 'if' part)				
Row Oper	Neg	State Variable Description		State	Trigge			
R1		Sensor, IS:AXR, for Sensor Ac	tive	False	V	Edit	Delete	
		Add State Varia	able] Check	State Variables				
			Logic Operator					
			AND			\searrow		
ctions								
		Consequ	ent Actions (the "	hen' part)				
Action Descri	ption							
On Change T	o False, I	Play Sound File from file, resour	ces\sounds\toggl	e-off.wav.		Edit	Delete	
On Change T	o True, P	lay Sound File from file, resource	es\sounds\toggle	-on.wav.		Edit	Delete	
Add Action Reorder								
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		Element Name						
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		Get References						

C bell

- Move the toggle switch into position on the bell cutout plate
- Now add a Logix and call it IX:AXC (Approach Bell Control)
- Create it.
- Add a 'New Conditional'.
- and call it 'Switch Click'.
- The variable is IS:AXR and we play 'toggle-on' when it goes 'true', and 'toggle-off' when it goes 'false'. Then 'Update Conditional'.

2009 Clinic 7 Edit Marker V	Vindow Help				C_	C TC bell
File Window Help	<u>O</u> ptions					
System Name 🕗	User Name	Enabled	Comment			Now open 'Plant 5 OS
IX4:TK	Plant 4 TK Indicator	\checkmark		Select	-	Indicator'.
IX5:TK	Plant 5 OS Indicator	\checkmark		Select		
IX5:WC	Plant 5 Switch Controller			Select		
IX5:WK	Plant 5 Switch Indicator			Select		
IX6:GC	Plant 6 Signal Controller	V	1	Select		
IX6:TAK	Plant 6 TAK Indicator			Select		
IX6:TBK	Plant 6 TBK Indicator			Select		
IX7:TK	Plant 7 OS Indicator			Select		
IX7:WC	Plant 7 Switch Controller			Select		
IX7:WK	Plant 7 Switch Indicator			Select		
IX8:TK	Plant 8 TK Indicator			Select		
IX9:TK	Plant 9 OS Indicator			Select		
IX9:WC	Plant 9 Switch Controller			Select		
IX9:WK	Plant 9 Switch Indicator			Select		
IX10:TAK	Plant 10 TAK Indicator	\checkmark		Select		
IX10:TBK	Plant 10 TBK Indicator			Select		
IX11:TK	Plant 11 OS Indicator	\checkmark		Select		
IX11:WC	Plant 11 Switch Controller	\checkmark		Select		
IX11:WK	Plant 11 Switch Indicator			Select	Ŧ	
Add	Element Name	6]	Find Orphans	Empty Cond'is		
	Get References					

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	JIMIN	J		1			
Window	gix Help						
THILDOW	L	ogix System Name IX5:TK		C ⁻	ГС	boll	
	Logix User Name	Plant 5 OS Indicator					
System I	Condii Name User Name	tionals (in Order of Calculation)		Select	•	Now open 'Plant 5 OS Indicator'.	
IX5:TKC	1 LS2	False	Edit	Select			
IX5:TKC	2 OS5 Bell	False	Edit	Select		Edit the OS5 Bell entry.	
				Select			
	New Condi	tional Reorder Calculate)	Empty Cond'Is			

	CTC
Edit Conditional	
Window Help Conditional System Name IX5:TKC2 Conditional User Name DS5 Bell	
Antecedent Variables (the "if part) Row Oper Neg State Variable Description State Trigge R1 Sensor, IS5:WAK, for Sensor Active False Image: Colspan="2">Image: Colspan="2">Image: Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2"	• Now open 'Plant 5 OS Indicator'.
	• Edit the OS5 Bell entry.
Add State Variables Logic Operator	• Add a new variable for the 'Bell Cutout' switch.
Actions Consequent Actions (the "then' part)	
Action Description	
On Change To True, Play Sound File from file, resources/sounds/Bell.wav. Edit Delete	
Add Action Reorder	
Update Conditional Cancel Delete Conditional	nd'Is
Done Delete Logix	



Edit Conditional							0
Window Help							
	Condition	al System Name IX5	TKC2				
	Conditional User Name	OS5 Bell					
Logical Expression:							
	Anteced	lent Variables (the 'if	part)				
Row Oper Neg	State Variable Description		State	Trigge			
R1	Sensor, IS5:WAK, for Sensor	Active	False		Edit	Delete	
R2 AND	Sensor, IS:AXR, for Sensor In	active	True		Edit	Delete	
	Add State Vari	able Check Stat	e Variables]			
		Logic Operator					
Actions							
	Consequ	ent Actions (the "then	'part)				
Action Description							
On Change To True, F	Play Sound File from file, resourc	es/sounds/Bell.wav.		(Edit	Delete	
	Add	Action Reorder					7.
			_			2	
	Update Conditional	Cancel	elete Con <mark>d</mark> iti	onal			nd'Is
				the second s			

- Now open 'Plant 5 OS Indicator'.
- Edit the OS5 Bell entry.
- Add a new variable for the 'Bell Cutout' switch.
- Uncheck the trigger option for the switch so the bell does not ring if the switch is thrown.
 'Update Conditional'



Edit Marker Window Help

Add ...

🗮 Logix Table File Window Help Options System Name User Name Enabled Comment IX4:TK V Select Plant 4 TK Indicator Plant 5 OS Indicator 1 IX5 TK Select V IX5:WC Plant 5 Switch Controller Select 1 IX5 WK Plant 5 Switch Indicator Select 1 IX6:GC Plant 6 Signal Controller Select . 1 IX6:TAK Plant 6 TAK Indicator Select V Plant 6 TBK Indicator Select IX6:TBK 1 IX7:TK Plant 7 OS Indicator Select 1 IX7:WC Plant 7 Switch Controller Select V IX7:WK Plant 7 Switch Indicator Select 1 IX8:TK Plant 8 TK Indicator Select V IX9:TK Plant 9 OS Indicator Select V Plant 9 Switch Controller IX9:WC Select V IX9:WK Plant 9 Switch Indicator Select V IX10:TAK Plant 10 TAK Indicator Select IX10:TBK Plant 10 TBK Indicator V Select 1 IX11:TK Plant 11 OS Indicator Select IX11:WC Plant 11 Switch Controller V Select 1 IX11:WK Plant 11 Switch Indicator Select 1.1 Element Name

Get References

- - X

Find Orphans

Empty Cond'Is

- Now open 'Plant 5 OS Indicator'.
- Edit the OS5 Bell entry.
- Add a new variable for the 'Bell Cutout' switch.
- Uncheck the trigger option for the switch so the bell does not ring if the switch is thrown.
 'Update Conditional'
- Now 'Copy' the changes from 'Plant 5 OS Indicator into 'Plant 7 OS Indicator'.



Edit Marker Window Help

_ 0 🗮 Logix Table File Window Help Options System Name User Name Enabled Comment IX4:TK V Select Plant 4 TK Indicator Plant 5 OS Indicator 1 IX5 TK Select V IX5:WC Plant 5 Switch Controller Select 1 IX5 WK Plant 5 Switch Indicator Select 1 IX6:GC Plant 6 Signal Controller Select . 1 IX6:TAK Plant 6 TAK Indicator Select V IX6:TBK Plant 6 TBK Indicator Select IX7:TK Plant 7 OS Indicator 23 - 0 Copy Logix IX7:WC Plant 7 Switch Controller Window Help IX7:WK Plant 7 Switch Indicator Logix System Name IX7:TK IX8:TK Plant 8 TK Indicator IX9:TK Plant 9 OS Indicator Logix User Name Plant 7 OS Indicator Plant 9 Switch Controller IX9:WC IX9:WK Plant 9 Switch Indicator Please enter system name and user name IX10:TAK Plant 10 TAK Indicator of target Logix, then click Copy IX10:TBK Plant 10 TBK Indicator Copy Cancel IX11:TK Plant 11 OS Indicator IX11:WC Plant 11 Switch Controller Select V 1 IX11:WK Plant 11 Switch Indicator Select 1.1 Element Name Add ... Find Orphans Empty Cond'Is

Get References

- - X

- Now open 'Plant 5 OS Indicator'.
- Edit the OS5 Bell entry.
- Add a new variable for the 'Bell Cutout' switch.
- Uncheck the trigger option for the switch so the bell does not ring if the switch is thrown.
 'Update Conditional'
- Now 'Copy' the changes from 'Plant 5 OS Indicator into 'Plant 7 OS Indicator'.



Edit Marker	Window Help			
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赌 Logix Table	the second second			
File Window H	lelp <u>O</u> ptions			
System Name 🕗	User Name	Enabled	Comment	
IX4:TK	Plant 4 TK Indicator			Select
IX5:TK	Plant 5 OS Indicator			Select
IX5:WC	Plant 5 Switch Controller			Select
IX5:WK	Plant 5 Switch Indicator	\checkmark		Select
IX6:GC	Plant 6 Signal Controller		1	Select
IX6:TAK	Plant 6 TAK Indicator	V		Select
IX6:TBK	Plant 6 TBK Indicator	V		Select
IX7:TK	PI			Plect
IX7:WC	Pla		elect	
IX7:WK	veviete. De veu weet eenv	elect		
IX8:TK	Pla Logix	nditionals of L	ogix "IX5-TK" into "IX7-TK"?	elect
IX9:TK	Pla			elect
IX9:WC	Pla		Yes No	elect
IX9:WK	Pla			elect
IX10:TAK	Plant 10 TAK Indicator	V		Select
IX10:TBK	Plant 10 TBK Indicator	V		Setect
IX11:TK	Plant 11 OS Indicator			Select
IX11:WC	Plant 11 Switch Controller			Select
IX11:WK	Plant 11 Switch Indicator			Select
-				J.
	Element Na	me		
Add			Find Orphans	Empty Cond'Is
	Get References			

- Now open 'Plant 5 OS Indicator'.
- Edit the OS5 Bell entry.
- Add a new variable for the 'Bell Cutout' switch.
- Uncheck the trigger option for the switch so the bell does not ring if the switch is thrown.
 'Update Conditional'
- Now 'Copy' the changes from 'Plant 5 OS Indicator into 'Plant 7 OS Indicator'.
- Yes, we do want to copy the new conditional.

2009 Clir Edit Ma	nic 7 rker Window Help			СТ	'C
			Second Maryon 1	C	TC bell
K Logix Table					
File Window	/ Help Options				No we don't need the
System Name /	Plant 4 TK Indicator	Enabled C	Select		annon we have it already
					sensor, we have it already,
IX5:WC	Input				so click 'Cancel'.
IX5:WK IX6:GC IX6:TAK IX6:TBK IX7:TK IX7:WC	Rename the copy of in Logix IX5:TKbein Press Cancel if you Copy of LS2	of Conditional "LS2 Ig copied into Logix I dont want to copy	" (IX5:TKC1) ("Plant 7 OS Indicator" (IX7:TK). this conditional. OK Cancel		
	Plant 9 TK Indicator	2	Select		
	Plant 9 OS Indicator	S	Select		
IX9:WC	Plant 9 Switch Controller		Select		
IX9:WK	Plant 9 Switch Indicator		Select		
IX10:TAK	Plant 10 TAK Indicator		Select		
IX10:TBK	Plant 10 TBK Indicator		Select		
IX11:TK	Plant 11 OS Indicator		Select		
IX11:WC	Plant 11 Switch Controller	V	Select		
IX11:WK	Plant 11 Switch Indicator		Select	-	
Add	Element Nam	ie	Find Orphans Empty Con	nd'is	



2009 Clinic 7									
Edit Marker Window Help									
			C.						
Logix Table									
File Window H	elp Options								
System Name 🗸	em Name A User Name Enabled Comment								
IX4:TK	Plant 4 TK Indicator	V	Select						
IX5:TK	Plant 5 OS Indicator		Select						
IX5:WC									
IX5:WK	Jt								
IX6:GC	Rename the copy	of Conditional "	OS5 Bell" (IX5:TKC2)						
IX6:TAK	in Logix IX5:TKbei	ng copied into L	ogix "Plant 7 OS Indicator" (IX7:TK).						
IX6:TBK	Press Cancel if yo	u dont want to d	copy this conditional.						
IX7:TK	Copy of OS5 Bell								
IX7:WC	Page 1000								
IX7:WK			OK Cancel						
IX9:TK	Plant 9 OS Indicator	V	Select						
IX9:WC	Plant 9 Switch Controller	\checkmark	Select						
IX9:WK	Plant 9 Switch Indicator	\checkmark	Select						
IX10:TAK	Plant 10 TAK Indicator	V	Select						
IX10:TBK	Plant 10 TBK Indicator	\checkmark	Select						
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IX11:WC	Plant 11 Switch Controller		Select						
IX11:WK	Plant 11 Switch Indicator	V	Select						
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	Element Na	me							
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- No, we don't need the sensor, we have it already, so click 'Cancel'.
- Yes we do need the new bell control, so rename to 'OS7 Bell' and add it by clicking 'OK'.



Edit Marker Window Help

P 2009 Clinic 7

Add ...

🗮 Logix Table File Window Help Options System Name / User Name Enabled Comment IX4:TK Plant 4 TK Indicator V Select 1 IX5 TK Plant 5 OS Indicator Select V IX5:WC Plant 5 Switch Controller Select 1 IX5 WK Plant 5 Switch Indicator Select 1 IX6:GC Plant 6 Signal Controller Select 1 IX6:TAK Plant 6 TAK Indicator Select V IX6:TBK Plant 6 TBK Indicator Select 1 IX7:TK Plant 7 OS Indicator Sel Lt 1 IX7:WC Plant 7 Switch Controller Select 1 IX7:WK Plant 7 Switch Indicator Select V IX8:TK Plant 8 TK Indicator Select V IX9:TK Plant 9 OS Indicator Select V Plant 9 Switch Controller IX9:WC Select V IX9:WK Plant 9 Switch Indicator Select V IX10:TAK Plant 10 TAK Indicator Select IX10:TBK Plant 10 TBK Indicator V Select V IX11:TK Plant 11 OS Indicator Select IX11:WC Plant 11 Switch Controller V Select 1 IX11:WK Plant 11 Switch Indicator Select 1.1 Element Name

Get References

- - X

Find Orphans

Empty Cond'Is

- No, we don't need the sensor, we have it already, so click 'Cancel'.
- Yes we do need the new bell control, so rename to 'OS7 Bell' and add it by clicking 'OK'.
- Do the same for the 'Plant 9 OS Indicator' and 'Plant 11 OS Indicator', being sure to edit each new entry to match its proper OS indicator.







- No, we don't need the sensor, we have it already, so click 'Cancel'.
- Yes we do need the new bell control, so rename to 'OS7 Bell' and add it by clicking 'OK'.
- Do the same for the 'Plant 9 OS Indicator' and 'Plant 11 OS Indicator', being sure to edit each new entry to match its proper OS indicator.
- We now have OS alarm
 bells with cutout.



2000 Clim

CTC

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CTC traffic direction

 Probably the most important item in the CTC logic is the traffic direction information. Internally this is required for each section of track. Usually the direction is only added to the panel itself for the single track sections, or double track where either track can have traffic in either direction. For purposes of this clinic we will add indicators for each direction controller. This information is what controls the signal 'Hold' status that allows the signals to be set to 'proceed' under dispatcher control.







 First we will add indicators for each traffic option. We will use 'green jewels for 'Righthand' and amber jewels for 'Lefthand' traffic.







- First we will add indicators for each traffic option. We will use 'green jewels for 'Righthand' and amber jewels for 'Lefthand' traffic.
- The first indicator is IS3:RSK (Plant 3: Right Stick indiKtor)





- 0 X 🛤 2009 Clinic 7 Edit Marker Window Help 0 28 BELL

- First we will add indicators for each traffic option. We will use 'green jewels for 'Righthand' and amber jewels for 'Lefthand' traffic.
- The first indicator is IS3:RSK (Plant 3: Right Stick indiKtor)
- Add it to the panel and move into position.







- First we will add indicators for each traffic option. We will use 'green jewels for 'Righthand' and amber jewels for 'Lefthand' traffic.
- The first indicator is IS3:RSK (Plant 3: Right Stick indiKtor)
- Add it to the panel and move into position.
- Now add IS5:ARSK (Plant 5: track A Right Stick indiKtor) IS5:BRSK, IS7:RSK, IS9:ARSK, IS9:BRSK, and IS11:RSK.



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- First we will add indicators for each traffic option. We will use 'green jewels for 'Righthand' and amber jewels for 'Lefthand' traffic.
- The first indicator is IS3:RSK (Plant 3: Right Stick indiKtor)
- Add it to the panel and move into position.
- Now add IS5:ARSK (Plant 5: track A Right Stick indiKtor) IS5:BRSK, IS7:RSK, IS9:ARSK, IS9:BRSK, and IS11:RSK.
- Add them to the panel and move them all into position.



Edit Marker W	indow Help	
000	Add Sensor (2009 Clinic 7) Find Icons Window Help To add these Icons to the Panel, Select Sensor from table, then press Add To Panel Active Inactive Unknown Inconsistent Unknown Inconsistent System Name User Name IS:AXR ISCLOCKRUN IS3:RSK IS4:TK IS5:BRSK Add to Panel Change icon Add item to table	
		Ð.
APPROACH BELL ALARM CUTOUT	MINIWACH HER PF UNION SWITCH & SERMAL DU SPRENT DECK I AR HERA ED ENVELVALLE FC. SST MODIFIE LA	

CTC traffic direction

• Now change to amber jewels.





- Now change to amber jewels.
- Add IS5:LSK (Plant 5: Left Stick indiKtor) and add it to the panel.

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Add Sensor (2009)	Clinic 7)				
Find Joans Minda					
To add these loops to	the Papel				
Select Sensor from tab	ble, then press Add To Panel				
Active	Inactive				
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System Name U	Jser Name				
ISCLOCKRUN					
IS3:RSK					
IS4:TK	IS4:TK				
IS5:BRSK	7				
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- Now change to amber jewels.
- Add IS5:LSK (Plant 5: Left Stick indiKtor) and add it to the panel.
- Move into position.





- Now change to amber jewels.
- Add IS5:LSK (Plant 5: Left Stick indiKtor) and add it to the panel.
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- Now add IS7:ALSK (Plant 7: track A left Stick indiKtor) IS7:BLSK, IS9:LSK, IS11:ALSK, IS11:BLSK, and IS13:LSK.

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- Add them to the panel and move them all into position.
- Add in some plain icons of the traffic arrows to make it nicer looking.



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CTC traffic direction

 This concludes the display portion of the CTC panel. We can add some text to clarify things.





Edit Marker Window Help

Traffic Simulator



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Traffic Simulator

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- This concludes the display portion of the CTC panel. We can add some text to clarify things.
- This panel includes traffic direction indicators in the passing areas to show the logic required for operation. This was not usually done for passing sidings, but was sometimes done on multi-track lines when traffic could normally be sent either way on the same line.






CTC traffic direction

- This concludes the display portion of the CTC panel. We can add some text to clarify things.
- This panel includes traffic direction indicators in the passing areas to show the logic required for operation. This was not usually done for passing sidings, but was sometimes done on multi-track lines when traffic could normally be sent either way on the same line.
- CTC panels did not have actual signal indications. Operators could only infer aspects from the status of the panel lamps.



CTC



CTC traffic direction

 Traffic Simulation. There is no
 connection to other CTC panels, so off board traffic is simulated.



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Traffic Simulator

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Traffic Simulator

CTC traffic direction

- Traffic Simulation. There is no
 connection to other CTC panels, so off board traffic is simulated.
- This panel is shown in the 'Normal' condition. All switches are set to the mainline.

CTC Clinic 1 - • × -Edit Marker Help CTC **Getting Started Lines Traffic Simulator** Traffic Simulator (†) +@(@)+ +@@+ Ø **②**।•**④**••**③**•**•④**••**③** Occupancy simulator SWITCH APPROAC BELL CUTOUT ION SWITCH & SIGN CENTRAL PA RS MADE

CTC operation

- This panel is shown in the 'Normal' condition. All switches are set to the mainline.
- All traffic direction levers are set to the middle 'Signals Normal' position. This holds all signals in the 'Stop' aspect.



CTC (Panel)

- What we have covered so far:
 - Placing signals on a panel.
 - Simple Panel Logic and sounds.
- Where we are going next:
 - CTC Panel Logix (09-8 CTC-Logix)