## Application Notes - SMRHS implementation of PanelPro

## Lockout Controls/Indications

The system uses one output to enable lockout; this drives one relay and one yellow LED in series. The contacts of the relay then determine how current is routed (current sinking outputs on C-MRI) – either through the C-MRI path (relay powered, lockout enabled) or local ground (relay not powered, lockout disabled).

JMRI software is setup to control the lockout as follows.

1. Create an Internal Sensor –note that we are using either the switch number (see LOCKOUT 255) or the JMRI sequential i/o (input/output) number (see L26 Reno). In this example we will use "L24".

Turnouts	All C/	MRI Internal				
Sensors Lights	Syste /	User Name	State	Comment		Inverte
Signal Heads	ISCLOC		Active		Delete	
Signal Masts	ISL102		Unknown		Delete	
ignal Groups	ISL92		Unknown		Delete	
teporters	IS26	Add New Sensor			· · · · · · · · · · · · · · · · · · ·	
emory Variables outes		System Internal		💌 🗌 Add a range		-
Routes	IS69	Hardware Address		Number to Add		
ogix	IS253	User Name: LOCKOU	T L24			1
locks	IS253.1			ОК		
ections	18255	LOCKOUT 255	Unknown		Delete	
ransits udio	18257	LOCKOUT 257	Unknown		Delete	
	18259	LOCKOUT 259	Unknown		Delete	
	IS261	LOCKOUT 261	Unknown		Delete	
	18263	LOCKOUT 263	Unknown		Delete	
	18265	LOCKOUT 265	Unknown		Delete	
	18267	LOCKOUT 267	Unknown		Delete	
	IS0069	LOCKOUT L26 Reno	Unknown		Delete	
	IS1043	LOCKOUT L16 Marysville	Unknown		Delete	

2. Create a Light output using the 1) hardware address = JMRI number scheme and 2) User Name nomenclature SME (switch machine enable) + switch number.

📑 Lights									_D×
File View Wi	Add/Edit Lig	ht			-OX				
Turnouts	Window Help	)				Enabled	Intensity		
Sensors Lights			System: C/MRI		r	0	Edit	-	
Signal Heads			System. Chird			V	0	Edit	
Signal Masts		Hard	ware Address: 54		V	0	Edit		
Signal Groups		ι	Iser Name: SMEL24		V	0	Edit		
Reporters Memory Variable	-Light Control-				V	0	Edit		
Routes	Control Ty	100	Description			V	0	Edit	
LRoutes	Control 13	ipe	Description						
Logix						2	0	Edit	
Blocks Sections						V	0	Edit	=
Transits						V	0	Edit	
Audio				101		V	0	Edit	
			Add Control	1		V	0	Edit	
				1		V	0	Edit	
	1	Select or enter data,	then press Create for a	new Light, or press Cancel.		V	0	Edit	
			Create Canc	el		V	0	Edit	
4	101	1				V	0	Edit	-
	CL54	SMEL24	Off		Delete	r	0	Edit	
	CL59	SMEL42	Off		Delete	V	0	Edit	
	CL62	SMEL46	Off		Delete	V	0	Edit	
	CL69	SMEL26	Off		Delete	r	0	Edit	
	CL72	SMEL54	Off		Delete	V	0	Edit	
	CL1003	SME207	Off		Delete	r	0	Edit	
	CL1006	SME209	Off		Delete	r	0	Edit	
	CL1009	SME215	Off		Delete	V	0	Edit	
	CL1012	SME217	Off		Delete	V	0	Edit	
	•								<b>I</b>
	Add	1							
- 11		Processory of the second se		The second se					1

 Then click Add Control, control type By Sensor, type in sensor name IS---(whatever you created in step 1). Sense for ON = ACTIVE (default). Click Create.

📑 Lights											
File View Wir	Add/Edit Li	aht					_ 🗆 🗵				
Turnouts	Window Hel	Enabled	Intensi	ty							
Sensors										0	E¢
Lights	System Name: CL54							V		0	E¢
Signal Heads Signal Masts	User Name: SMEL24									0	E¢
Signal Groups	Light Control	Light Control								-	
Reporters	Control T	уре	Descrip	tion			1			0	E¢
Memory Variable						<b>21</b>	dd/Edit Light	Control	_ 🗆 🗙	0	E¢
Routes						Wi	ndow Help				E¢
LRoutes Logix	Control Type Non							one 💌		0	E¢
Blocks Sections	No Automa									0	E¢
Transits	1				7		By	Sensor	_	0	Ε¢
Audio	Creat By 1							y Fast Clock y Turnout Status		0	E¢
								Timed ON			E¢
		Chang	e data and pres	ss update,	or press Cancel.		By	Two Senso	s	-	
										0	Ec
			Update	Can	Cel			V		0	E¢
	CL46	SMEL66		Off			Delete	V		0	E¢
	CL51	SMEL22		Off			Delete	r		0	E¢
	CL54	SMEL24		Off			Delete	~		0	E¢

4. Now you are ready to put the icon for the Internal Sensor on the layout schematic. In the screen, note we have checked "Sensor Icon" and typed in the name ISL24. Holding the Shift key, left-button mouse click to drop the new icon onto the drawing somewhere. Once it is placed, you can right click/drag into position. Left-click the icon to change state, it will settle into a 2-state indication, yellow=on, gray=off. If you watch the Lights table you will see the corresponding output toggle on/off; and if you have the output connected out at the layout you should see the yellow LED fire and the relay should 'click' on/off.

ools Zoom Marker Window Help
ion - x: 381 y: 330 Turnout: Name Type RH LH WYE Double Xover RH Xover LH Xover Rotation
Block: Name Occupancy Sensor Track: Level Crossing Track Segment Dashed Mainline
Track Nodes: End Bumper Anchor Point Labels: Text Label Memory Label
□ Multi-sensor Change Icons V Sensor Icon ISL24 □ Signal Head Icon □ Icon Label
SIERRA CENTRAL RR
Oroville
U Desent To C C C

## **Cross Over Switches**

We are using two discrete pairs of CMRI outputs coupled to two discrete relay interface boards to control each switch machine. The CMRI outputs are set up as binary (two bits used per switch) with a –A and –B suffix to the same <u>SMC</u># or <u>SMCL#</u>. See SMCL26\_a and –B below.

urnouts		MRI Internal						
ensors	Syste A	User Name	Cmd	Comment		Inverted	Locked	
ights ignal Heads	CT52	SMCL24	Closed	Spur Switch Position Normal	Delete			
ignal Masts	CT57	SMCL42	Unknown	Spur Switch Position Normal	Delete			
ignal Groups	CT60	SMCL46	Unknown	Spur Switch Position Normal	Delete			
eporters lemory Variables	CT65	SMCL26-A	Closed	Spur Switch X-OVER L26-A	Delete	~		
outes	CT67	SMCL26-B	Closed	Spur Switch X-OVER L26-B	Delete	~		
Routes ogix	CT70	SMCL54	Unknown	Spur Switch Position Normal	Delete			
locks	СТ73	SIG201WMT-G	Unknown		Delete			
ections ransits	CT74	SIG201WMT-R	Unknown		Delete			
udio	CT75	SIG201WDT-G	Unknown		Delete			
	CT76	SIG201WDT-R	Unknown		Delete			
	CT77	SIG201EMF-G	Unknown		Delete			
	CT78	SIG201EMF-R	Unknown		Delete			
	CT79	SIG201EDF-G	Unknown		Delete			
	СТ80	SIG201EDF-R	Unknown		Delete			-

An internal switch machine control (SMC or SMCL) is created in the PanelPro software to logically combine the two pairs of discrete binary outputs.

				THE M	1v Lavout				
🎬 Turnouts									
File View Automation	n Window	Help							
Turnouts	All C/	MRI Internal							
Sensors	Syste A	User Name	Cmd	Comment		Inverted	Locked		
Lights Signal Heads	IT26	SMCL 26	Closed		Delete			<b>^</b>	
Signal Masts	IT27		Unknown		Delete				
Signal Groups Reporters	IT217	SMC 217	Unknown	Martinez X-Over (West)	Delete				
Memory Variables	IT219	SMC 219	Unknown	Martinez X-Over (East)	Delete				
Routes LRoutes	IT221	SMC 221	Unknown	Mikon X-Over (East)	Delete				
Logix Blocks Sections Transits Audio	Window Help   System Internal   Hardware Address   223   Number to Add   User Name:   SMC 223								
	Add	I 🗌 Show feedback in	nformation	Show lock information	Automatic ret	ry		• • • • • • • • • • • • • • • • • • •	

A LOGIX is set up to link the internal turnout to the two discrete switch machine controls.

File     View     Options     Tools     Window     Help       Turnouts     System Name /     Image: Control of the system Name /     Image: Control of the system Name /	
Turnouts System Name / Edit Logix	1 ľ
Turnouts System Name A	
Sensors SMC Window Help	
Lights Logix System Name IX:AUTO:0001	
Signal Masts SIG253EMF_UPPER Sig Logix User Name SMCL26	
Signal Groups Reporters	
Memory Variables SIG263EDF Sig Conditionals (in Order of Calculation)	
Routes         Sig         System Name         User Name         State           I Routes         IX:AUTO:0001C1         L26 Thrown         False         Edit	
Lacia SIG263WDE LOWER Sig	
Blocks SIG263WMF_UPPER Sig	
Sections Transits	
Audio	
	-
New Conditional Reorder Calculate	
	-
Done Delete Logix	]   -
	Ļ
Add	

Each state (thrown, closed) is defined for the internal switch and then the logic is embedded (click on the <u>Edit</u> button)

🚆 Edit 🛛	Conditio	nal							
Windo	w Help								
				Conditional System	Name IX:AU	JTO:0001C1			
			Conditi	onal User Name L26 Thr	own				
Logica	l Expres	sion:-							
_	-			Antecedent Var	iables (the '	if' part)			
Row	Oper	Neg	St	ate Variable Description			Trigger Cal		
R1				6" state is Turnout Throwi	n	False	~	Edit	Delete
				Add State Variable	Check S	tate Variables			
				Logic	Operator				
				AND					
				Execute actions	-	-			
				Execute Actions	whenever ti	riggered			
Action	\$								
				Consequent Acti	ions (the 'the	en' part)			
				Action Description					
On Ch	ange To	True, Se	et Turnout, "SMCL	26-A" to Thrown				Edit	Delete
On Change To True, Set Turnout, "SMCL26-B" to Thrown								Edit	Delete
				Add Action	Reord	der			
				date Conditional C	ancel	Delete Condit			

And here is the opposite state:

						1v Lavout					
💐 Edit Conditi	onal							_ D ×			
Window Hel	р										
	Conditional System Name IX:AUTO:0001C2										
	Conditional User Name L26 Closed										
Logical Expre	ssion:-										
			Antocod	lent Variables (the '	if' nart)						
Row Oper	Neg	01	ate Variable Descr		State	Triagon Col					
Row Oper	Neg		ate variable Descr ate is Turnout Clo:		True	Trigger Cal	Edit	Delete			
		Turnout 1120 St	ate is runnout CIU:	ocu	nue		Euit	Delete			
			Add State Varia	able Check S	tate Variable:	5					
				Logic Operator							
				AND 🔽							
			Everute :	actions on change o	of state only						
				Actions whenever t	_						
			U Execute /	ACTIONS WHENEVER O	nggereu						
Actions											
				ent Actions (the 'the	en' part)						
			Action Descrip	tion							
On Change T	o True, Si	et Turnout, "CT65"	to Closed				Edit	Delete			
On Change T	On Change To True, Set Turnout, "CT67" to Closed Edit Delete										
·											
			Add	Action Reor	der						
			udato Conditional	Canaal	Delete Condi	tional					
		Uk	odate Conditional	Cancel	Delete Condi						