# Remote Switch Feature for the SignalFire RSD Stick

# **Overview**

The SignalFire RSD Stick can be used as a "receiver" for multiple remote nodes and it can use the data from those remote nodes to set its relay outputs. The RSD stick is a standard Modbus Stick connected to a RSD module and configured for RSD Remote Switch operation. This topology is shown in the following figure:



In the above example, the customer is controlling a pump with the RSD Stick's Relay Module output and a real-world example would be to shut the pump down if any one of the tanks becomes full.

<u>Note that this system is stand-alone</u>. There is no gateway so there is no means of extracting data from the system. SignalFire offers a system which includes a gateway if data is desired, but this system is the simplest means of performing shutdown functionality.

In order to implement this system, the remote nodes (Sentinels) must be configured in the standard manor. The RSD Stick needs to have the control logic set up in it so that the relay module performs the proper switching function.

## **Relay State Details**

The relays used on the Output Module are SPDT (NO/NC) relays. They have the following ratings:

- 30 VDC 2 A
- 125 VAC 0.5 A
- 10<sup>8</sup> Operations (life)

The relays are have Normally Open (NO) and Normally Closed (NC) contacts.

# The "Normal" state of the relay is the un-energized state and this state should be used to have the controlled system (pump, motor,...) in the "safe" or "off" state.

The logic that you will set in the RSD Stick relies on this.

#### Configuring the RSD Stick for Remote Switch Functionality

The RSD Stick must have firmware version 0.53 or later installed on it to allow the Remote Switch Functionality. The firmware supports both the standard RSD Stick operation as well as the new Remote Switch functionality. You can change the RSD Stick from one type to the other using the SignalFire ToolKit version 0.59 or later.

File Optio	ons Help	
Auto-Detect	Device	
COM Port:	COM1   Refresh	J SIGNALFIKE
Select	COM Port to Auto-Detect	whereas telemetry
Auto D	staat Davias on COM Pat	
Auto-D	elect Device on COW Port	Customer Login: None

To switch from the standard RSD (or Modbus) Stick to the Remote Switch Stick functionality, use the ToolKit File pulldown menu at the top and enable or disable the functionality.

RSI	D Stick					
File	Help					Passed
	Upgrade Mainboard	Firmware	Reported Co	ounter Values		
	Upgrade Radio Firm	iware	Address	Description	Va	lue
	Edit Register Map		1100	RSD Type	1	
	Open Config File	Chileo	1102	Input1 State	0	
	open coning rile	Curro	1102	Relav1 State	0	
	Save Conhig File	Ctrl+S	1104	Relay2 State	0	
	RSD Function	•	1105	Relay1 Fault Flag	0	
	Mirror Eupction	•	1106	Relay2 Fault Flag	0	00
			60032	Battery Voltage (m	vj 91	30
	Remote Switch Fun	ction 🕨	Enabled			
	Exit	Ctrl+Q	1			
T nat	dio Version dia Address	2.47		Update Reported F	RSD Values	
Cor	norate ID	144		eic Begister Man		
Ra	dio Network	0		sic riegister map		
Ra	dio Network Group	0	Relay Settin			
Ra	dio Power (dBm)	5	Relay Comm	i Failsate Timer (min)	Disabled	▼ <u>Set</u>
Rel	lay1 State	De-energized	Relay Msg F	ailsafe Timer (min)	Disabled	▼ Set
Bel	lay2 State	De-energized Disabled	State Chang	e Checkin	0#	▼ Set
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No	de Name	not set	Relay 1 Con	trol ENERGIZE	DE-	ENERGIZE
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Bring up the RSD Switch Stick window by selecting the correct COM port and pressing the Auto-Detect button on the main ToolKit screen. Alternatively, you can select from the drop-down Select Device button.

COM Port: COM2	Refresh	Relay Cł	nannel 1	Relay v	vill de	-energize when one or m	ore of the conditions b	elow are true				Refresh		
COM2 O	pen		Slave ID	Node Type		Begister Address	Benister Tune	De-energize R	elay	Value	Register Value	Battery (mV)	BSSL(dt	
Open	Close	▶ 1	0	None	-	0 🛃	16bit UINT 🖉	Less than	-	0		(mir)		
Causard	Ladara I	2	0	None	-	0	16bit UINT 💌	Less than	-	0	ų. 1			
Lonnect/L	ipdate	3	n	None	-	n 🚽	16bit LUNT	Less than	*	n				
Product	REMOTE SW	<u> </u>	-	None					- Local	121				
Slave ID	N/A	4	U	None		U 🔟	16bit UIN I	Less than	•	U				
lode Name	N/A	5	0	None	-	0 💌	16bit UINT 🖉	Less than	-	0				
Tadio Lonnectivity	GATEWAY	c	0	None		0	1658 LIINT	Less than	-	0		-		
Radio Version	2.45			THONG .		· ·		Less tidi					-	
Radio Address	4401	7	0	None	-	0	16bit UINT	Less than	•	0				
Corporate ID	0	8	0	None	-	0 👻	16bit UINT 👻	Less than	-	0				
adio Network	3							-	-		() ()	- 1.j.	1	
Radio Network Group	0	Relay C	hannel 2	Deleur	an as			atani ara tana				Refresh		
Radio Power (dBm)	5	Tieldy C		nelay v	vili de	energize when one or m	ore or the conditions b	elow are true						
Checkin Interval	N/A		and the second					De-energize R	elay		Register	Battery		
State Change Checkin	N/A Output		Slave ID	Node Type		Register Address	Register Type	when		Value	Value	(mV)	RSSI (dl	
Thannel 1 Output State	Energized	▶ 1	0	None		0 🚽	16bit UINT 🛛 👻	Less than	-					
hannel 2 Mode	Output	2	0	Mana	land 1	0	1CEALUNT	Lass these		0	6			
Channel 2 Output State	Energized		0	NUTIE		<u> </u>		Less man	-	0	b	12	-	
Relay Comm Failsafe	N/A	3	0	None	•	0	16bit UINT 🔄	Less than	•	0				
Relay Mesg Failsafe	N/A	4	0	None	-	0 -	16bit UINT 👻	Less than	-	0				
		5	0	None		n 두	166#LUNT	l less than		0	-		-	
			0	Mono		n <b>–</b>	1C53 LUNT	Loos than		0		+		
			0	NUT	-	• <u>•</u>			-	0	12		-	
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Node Name	Set	8	0	None	-	0 👱	16bit UINT 🔄	Less than	*	0				
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Radio Network Group	0 V Set	Read	I Hemote Swi	tch Settings	Write	e Remote Switch Setting:	8			iave to File	Load from	n File	ear Lables	
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You will see the "Standalone Remote Switch" configuration screen.

The only system configuration items that you will need to set are:

- Radio Network
- Radio Network Group

These must be set to be the same as the remote nodes in the network. Only units with matching network and group settings will communicate with one another.

## Setting up the Relay Control Logic

Now, you need to set up the logic in the Relay Tables. There is an 8 line table for Relay 1 and another 8 line table for Relay 2. Here is a screen shot of the table filled out for a four-node system controlling Relay 1:

COM Port: COM2	- Refresh	Relay C	hannel Contr iannel 1	ol Belau	will de	eneraize when one	or m	ore of the conditio	ins he	low are true				Refresh		
COM2 C	Ipen		Slave ID	Node Type		Benister Addres	s.	Benister Tun	e	De-energize R	elay	Value	Register Value	Battery (mV)	BSSL(dB	
Open	Close	▶ 1	1	Sentinel Analog	-	3001-Current(uA)		16bit UINT	-	Greater than	-	18000	12	3705	-38	
0		2	2	Sentinel Analog	-	3001-Current(uA)	-	16bit UINT	-	Greater than	-	18000	12	3694	-31	
Lonnect/L	Ipdate	2	2	Sentinel Analog	-	3001-Current(uA)	-	1659 LUNT	1000	Less than	-	10000	12	3699	.36	
Product	REMOTE SW			SendrierAnalog	10.00	3001-Callent(uA)	10.00	TODICONAT	0.00	Less tridin		10000	12	3033		
Slave ID	N/A	4	4	Sentinel Analog	-	3001-Current(uA)	-	16bit UINT	-	Less than	*	10000	12	3719	-43	
Node Name	N/A	5	0	None	-	n	-	16bit LUNT	-	Less than	+	0				
Radio Connectivity	GATEWAY		-		1 internal		Line	1000 0100	in the second	Love dram	10000			+		
Mainboard Version	0.23	6	U	None	-	U	_	16bit UIN I	•	Less than		U		1		
Radio Version	2.45	7	0	None	-	0	-	16bit UINT	-	Less than	-	0				
Hadio Address	4401		0	Massa	(inter	0	lind	1055 LUNIT	since	Lana dana	192	0		+	+	
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Radio Network Group	0	άř.										Î		22582 W		
Badio Power (dBm)	5	Relay C	nannel 2	Relay y	vill de	e-energize when one	or m	ore of the conditio	ins be	low are true			Refresh			
Checkin Interval	N/A		-	1	-								-		1	
State Change Checkin	N/A		Change ID	Made Tores		Destates Address		Desister Ton	-	De-energize H	elay	Verber.	Hegister	Battery	Decid	
Channel 1 Mode	Output		Slave ID	Node Type		negister Addres	S	negister i yp	e	when		Value	Value	(mv)	nəəl (di	
Channel 1 Output State	De-energized		0	None		0		16bit UINT		Less than		0				
Channel 2 Mode	Output	2	0	None	-	0	-	16bit UINT	-	Less than	-	0		1		
Channel 2 Output State	De-energized			1				401510017	100.00					-	-	
Relay Comm Failsafe	N/A	3	U	None		U		16bit UINT		Less than		0				
Relay Mesg Failsate	N/A	4	0	None	-	0	-	16bit UINT	-	Less than	-	0				
		5	0	None	-	n	1000	1650 LUNT	1000	Less than	-	0		-		
			0	11000	1000	°	Ligned	TODICONT	10000	Loss than	and a second			+		
		6	U	None		U		16bit UIN I	-	Less than	-	U	-	-		
Callings		7	0	None	•	0	-	16bit UINT	-	Less than	•	0				
Node Name	Set	8	0	None	-	0	-	16bit UINT	-	Less than	•	0				
Radio Network	3 T Set		2 0 2 3		10.118		13	1				0. 445	1 <sup>0</sup> 10 033		N 22023	
Badio Network Group	0 T Set	Read	Hemote Swi	tch Settings	Wn	e Remote Switch Se	etting	5				ave to File	Load from	n File	ear I ables	
Uneckin Interval																

Each line in the table represents a data element (register) in one remote node. In this example, there are four Sentinel Analog nodes controlling Relay 1. The relay will de-energize (go to the safe or "alarm" state) when any single line is true. So, in this case, the relay will de-energize if:

- Sentinel (Slave ID 1) has a 4-20 mA reading above 18 mA OR
- Sentinel (Slave ID 2) has a 4-20 mA reading above 18 mA **OR**
- Sentinel (Slave ID 3) has a 4-20 mA reading below 10 mA  $\overline{\mathbf{OR}}$
- Sentinel (Slave ID 4) has a 4-20 mA reading below 10 mA

The other way to look at it is the relay will only be energized (operating state for the equipment) is if all four lines are not true or not in the "alarmed" state (no line is "alarmed").

Each line should represent an "alarmed" condition. For example, for line 1 and 2, you might have a pressure sensor that has a higher reading as the tank becomes fuller. Above 18 mA (18,000 uA is the actual register value), we want to shut down a pump.

Lines 3 and 4 might represent a level switch with 12 mA output when the level is below the switch and 8 mA when the level is at the switch or above. In this case, you want to shut down when the reading goes to 8 mA (below 10 mA in the example) and the pump can be on when above 10 mA.

The user interface helps you by only allowing selections that make sense for the remote node type you select.

#### Node Presence

If any node times out (stops communicating with the Remote Switch Stick), it will cause the system to set the relay to the safe state. Consequently, all nodes must be on and actively communicating to the Stick in order for the relay to be energized (assuming all data supports an energized relay).

## **Buttons in the Setup Screen**

Standalone Remote	Switch														
File Help															Passed
-		Relay C	hannel Contr	ol											
CUM Port: COM2	Hetresh	Relay Ch	annel 1	Relay wil	l de	e-energize when one or	r m	ore of the condition	s be	low are true				Refresh	
COM2 0	pen		Slave ID	Node Type		Register Address		Register Type		De-energize Re when	elay	Value	Register Value	Battery (mV)	BSSI (dB)
Open	Close	▶ 1	1	Sentinel Analog	-	3001-Current(uA)	-	16bit UINT	-	Greater than	-	18000	12	3705	-38
Connect/II	ndate 1	2	2	Sentinel Analog	•	3001-Current(uA)	•	16bit UINT	+	Greater than	*	18000	12	3694	-31
		3	3	Sentinel Analog	-	3001-Current(uA)	-	16bit UINT	-	Less than	•	10000	12	3699	-36
Product	REMOTE SW			Cautinal Analan		2001 Committee()		1053 LUNIT	alocal	1	100	10000	10	2710	42
Slave ID	N/A	4	4	Senuriei Analog		SOOT-Culleni(uA)	M	TODICUTINT	2.61	Less man		10000	12	5/15	-40
Node Name	N/A CATEWAY	5	0	None	-	0	-	16bit UINT	+	Less than	-	0			
Mainboard Version	0.23	6	0	None	-	0	-	16bit UINT	-	Less than	-	0			
Radio Version	2.45		0	1				101 Y LUNIT	Training of	1 4		0		-	
Radio Address	4401	[ <i>(</i>	U	None	•	U	•	T6DIEUIN I	by de	Less than	×	U			
Corporate ID	0	8	0	None	-	0	-	16bit UINT	-	Less than	•	0			
Radio Network	3			-			-		_					1	
Radio Network Group	0	Belau O	annel 2	D alau wi	i de la			ere ef the eenditien	. he	laur ara kura				Refresh	
Radio Power (dBm)	5	Troidy Ci		neidy wii	r ue	senergize when one of	1110	ore or the condition	s De	iow are true	- 0		i	11	7
State Change Checkin	N/A N/A									De-energize Re	elay		Register	Battery	
Channel 1 Mode	Output	8	Slave ID	Node Type	_	Register Address	_	Register Type		when		Value	Value	(mV)	RSSI (dB)
Channel 1 Output State	Deveneraized	▶ 1	0	None	-	0	-	16bit UINT	+	Less than	*				
Channel 2 Mode	Output	2	0	None	-	۵.	-	16bit LUNT	-	Less than	-	0	6	1	
Channel 2 Output State	De-energized		-					TODE CHIT	Contract of	Looo didir	-			12	
Relay Comm Failsafe	N/A	3	0	None	•	0	•	16bit UINT		Less than	•	0			
Relay Mesg Failsafe	N/A	4	0	None	-	0	-	16bit UINT	-	Less than	•	0			
		5	0	None	-	0	-	16bit UINT	-	Less than	-	0			
		6	0	None	•	0	-	16bit UINT	+	Less than	+	0			
1		7	0	None	-	0	-	16bit UINT	-	Less than	-	0			
Settings Node Name	Set 1	8	0	None	•	0	-	16bit UINT	-	Less than	*	0			
Radio Network	3 • Set							1					l' v so		- 
Radio Network Group	0 V Set	Head	Hemote Swi	ton settings	writ	e nemote Switch Setti	ings					ave to File	Load from		iear i ables
Slave ID	Set														
Checkin Interval	▼ Set														
State Change Checkin	▼ Set														
ccess															

<u>Radio Network and Group</u> – Enter the settings in the windows and press the "Set" button to write the setting to the node. You will see the updated values in the settings window above.

<u>Read Remote Switch Settings</u> – Pressing this will read the configured threshold settings from the node into the tables.

<u>Write Remote Switch Settings</u> – Pressing this will write the contents of the threshold settings from the two tables into the node.

<u>Clear Table</u> – Pressing this will clear the tables so you can start fresh.

<u>Save/Load From File</u> – This will save the contents of the threshold tables to a file so you can later recall it if you are configuring multiple Remote Switch Nodes to the same threshold values.

<u>Refresh</u> – This will update the actual remote node Register Values, Battery Values, and RSSI (right side of table) in the tables.