

Small SCADA Case Study Using Centralized RTAC

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What Is SCADA?

- Supervisory control and data acquisition
- Telemetry systems
- Data logging
- Remote terminal unit (RTU)
- Operator interface terminal (OIT)
- Human-machine interface (HMI)
- Distribution management system (DMS)
- Generation management system (GMS)
- Energy management system (EMS)



100 Years of SCADA



Maintained

Historical

Operational

Ubiquitous

What's the "right" amount of SCADA? i.e. What do you need to do?

- Status information
- Analog metering
- Binary controls
- Analog Setpoints
- SOE Logging
- Time synchronization

- Historical analog trends
- Event capture
- Engineering Access
- Human-Machine Interface
- Troubleshooting tools
- Messaging (SMS, E-mail)

What do you need to do?



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Reliability and Redundancy

- 3555 RTAC Hardware:
 - No moving parts
 - Exe-Guard whitelisting
 - Dual power supplies
 - No Windows updates!
 - RTAC Library for Redundancy



SECTION 12

IPAliasRedundancy

Introduction

This library provides functionality to manage an additional IP alias (a second IP address) added to a specified interface on an SEL Real-Time Automation Controller (RTAC). The function blocks in this library are designed to work in a redundancy scheme by using an IP alias to be shared between two RTAC units. The two RTAC units will communicate with each other via the logic in this library to decide when the IP alias should and should not be active on the specified interface. The primary IP address for interfaces on the RTAC are still configured via the web interface.

The two RTACs managing the IP alias communicate via an Ethernet or serial connection. The library only supports the use of one or the other connection type (do not use both simultane ously). If the RTACs communicate via Ethernet, it is recommended that a separate interface than the managed interface is used for communications. (This is not an absolute requirement—the two RTACs can communicate via the same interface that is being managed—see *Frequently Asked Questions* on page 12.2 for details.) Information between the two RTACs is updated at least once a second regardless of which connection is used.

RTAC Hardware Design



But SEL doesn't make SCADA Systems !?!







• Live Data: Instantly display and drill down on any data point in the system

Live Data			# Forced = 0	orce Unforce	Unforce & Restore
Filter: Name Contains Label: All Sta	atus Contains Quality: All	Type: All Filter: Non	e 🥝 🖬 🗱 🔑 🔎 Adv	anced	
Name	Label	Status	Prepared Timestamp	Quality	Туре
SEL_351S_Feeder_4_SEL.FM_INST_52A	Feeder 4, Binaries	false	2017-04-03 20:57:31.108961	invalid	SPS
SEL_351S_Feeder_4_SEL.FM_INST_79L0	Feeder 4, Binaries	false	2017-04-03 20:57:31.108961	invalid	SPS
E SEL_351S_Feeder_4_SEL.FM_INST_IA	Feeder 4, Currents	0.0@ 0.0	2017-04-03 20:57:31.108961	invalid	CMV
SEL_351S_Feeder_4_SEL.FM_INST_IB	Feeder 4, Currents	0.0@ 0.0	2017-04-03 20:57:31.108961	invalid	CMV
SEL_351S_Feeder_4_SEL.FM_INST_IC	Feeder 4, Currents	0.0@ 0.0	2017-04-03 20:57:31.108961	invalid	CMV
EL_351S_Feeder_4_SEL.FM_INST_P_WATTS	Feeder 4	0.0	2017-04-03 20:57:31.108961	invalid	MV
SEL_351S_Feeder_4_SEL.FM_INST_Q_VARS	Feeder 4	0.0	2017-04-03 20:57:31.108961	invalid	MV
SEL_351S_Feeder_4_SEL.FM_INST_RMB1A	Feeder 4, Binaries, Higl	h Speed false	2017-04-03 20:57:31.108961	invalid	SPS
SEL_351S_Feeder_4_SEL.FM_INST_RMB2A	Feeder 4, Binaries, High	h Speed false	2017-04-03 20:57:31.108961	invalid	SPS
SEL_351S_Feeder_4_SEL.FM_INST_TMB1A	Feeder 4, Binaries, Higl	h Speed false	2017-04-03 20:57:31.108961	invalid	SPS
SEL_351S_Feeder_4_SEL.FM_INST_TMB2A	Feeder 4, Binaries, High	h Speed false	2017-04-03 20:57:31.108961	invalid	SPS
SEL_351S_Feeder_4_SEL.FM_INST_VA	Feeder 4, Voltages	0.0@ 0.0	2017-04-03 20:57:31.108961	invalid	CMV
SEL_351S_Feeder_4_SEL.FM_INST_VB	Feeder 4, Voltages	0.0@ 0.0	2017-04-03 20:57:31.108961	invalid	CMV
SEL_351S_Feeder_4_SEL.FM_INST_VBAT	Feeder 4, Voltages	0.0	2017-04-03 20:57:31.108961	invalid	MV
SEL_351S_Feeder_4_SEL.FM_INST_VC	POU Pins	0.00 0.0	2017-04-03 20:57:31.108961	invalid	CMV
SEL_351S_Feeder_4_SEL_POU.Auto_Configuration	_Failure POU Pins	false	***		BOOL
SEL_351S_Feeder_4_SEL_POU.Event_Collection_C	ount POU Pins	0			UDINT
SEL_351S_Feeder_4_SEL_POU.Initiate_Auto_Confi	guration POU Pins	false			BOOL
SEL_351S_Feeder_4_SEL_POU.Message_Received	_Count POU Pins	0			UDINT
SEL_351S_Feeder_4_SEL_POU.Message_Sent_Cou	Int POU Pins	4871		***	UDINT



- 3555/3560 supports 100,000 data tags
- Native SEL-FM at head-end allows for STRING data for Fault Type from relay History messages
- Voltage and currents as phasors (mag & angle)
- Direct to field relays over ethernet/cellular or consolidated data sets from substation RTUs

New Control Schemes?



Sequence of Events? V

- 30,000 logs in a FIFO buffer
- Export to .csv

• ODBC connection

• Filtering and alarming

 Integration with Syslog

EL Time: Mon, Jul 8, Device: SEL-3530	2019 8:28:02 PM)-Station-2		000	
avigation 🔺				
ashboard	Sequence of Events Report			
usinouru	Actions	V Reload	Table	
ystem	Catagory •	Catagony	•	
ate/Time	Category ·	Category	·	
sage Policy	Time Stamp 🔻	То		Filter Reset
evice Management				
le Manager	Details Time Stamp Prior	rity Category	Tag Name	Message
oiect Upload	[open] 2019-07-08 20:27:47.116	Security	SystemTags.User_Logged_On	SEL logged on device via Web
censed Features	[open] 2019-07-06 03:15:07.346	Security	SystemTags.User_Logged_Off	SEL logged off device via ODBC
	[open] 2019-07-06 03:10:36.178	Security	SystemTags.User_Logged_Off	SEL logged off device via ODBC
	[open] 2019-07-06 03:10:34.934	Security	SystemTags.User_Logged_Off	SEL logged off device via ODBC
ser	[open] 2019-07-06 03:10:01.795	Security	SystemTags.User_Logged_Off	SEL logged off device via Web
counts	[open] 2019-07-06 03:09:38.540	Security	SystemTags.HMI_Control_Operation	SEL performed control operation on Application.HMI.FDR2_HLT.operPulse via HMI
ser Roles	[open] 2019-07-06 03:09:35.940	Security	SystemTags.HMI_Control_Operation	SEL performed control operation on Application.HMI.FDR2_HLT.operPulse via HMI
DAP Settings	[open] 2019-07-06 03:09:33.340	Security	SystemTags.HMI_Control_Operation	SEL performed control operation on Application.HMI.FDR2_TRIP_CLOSE.operClear via HMI
ADIUS Settings	[open] 2019-07-06 03:09:29.840	Security	SystemTags.HMI_Control_Operation	SEL performed control operation on Application.HMI.FDR2_HLT.operPulse via HMI
	[open] 2019-07-06 03:09:27.140	Security	SystemTags.HMI_Control_Operation	SEL performed control operation on Application.HMI.FDR2_HLT.operPulse via HMI
etwork	<pre>[open] 2019-07-06 03:09:24.040</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR1 HLT.operClear via HMI
CEWOIR	<pre>[open] 2019-07-06 03:09:21.540</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR1_HLT.operSet via HMI
terface	<pre>[open] 2019-07-06 03:09:17.140</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR2 HLT.operPulse via HMI
atic Routes	<pre>[open] 2019-07-06 03:09:08.240</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR2_TRIP_CLOSE.operClear via HMI
osts	<pre>[open] 2019-07-06 03:09:05.940</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR2_TRIP_CLOSE.operSet via HMI
/slog	[open] 2019-07-06 03:08:57.840	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR2_HLT.operPulse via HMI
	<pre>[open] 2019-07-06 03:08:47.340</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR2_TRIP_CLOSE.operClear via HMI
ecurity	<pre>[open] 2019-07-06 03:08:44.040</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR2_TRIP_CLOSE.operSet via HMI
509 Certificates	<pre>[open] 2019-07-06 03:08:40.136</pre>	Security	SystemTags.User Logged Off	SEL logged off device via ODBC
A Certificates	<pre>[open] 2019-07-06 03:08:24.840</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR1 TRIP CLOSE.operClear via HMI
SH Keys	<pre>[open] 2019-07-06 03:08:21.040</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR1_HLT.operClear via HMI
essword Report	<pre>[open] 2019-07-06 03:08:14.240</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR1 TRIP CLOSE.operClear via HMI
issword report	<pre>[open] 2019-07-06 03:08:09.940</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR1_HLT.operSet via HMI
	<pre>[open] 2019-07-06 03:08:00.740</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application. HMLEDR1_HLT.operClear via HML
eports	<pre>[open] 2019-07-06 03:07:57.640</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application.HMI.FDR1 TRIP CLOSE.operClear via HMI
onnected IED	<pre>[open] 2019-07-06 03:07:52.840</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application. HMLEDR1_HLT.operSet via HML
arm Summary	<pre>[open] 2019-07-06 03:07:04.740</pre>	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application. HMI.FDR1_TRIP_CLOSE_operSet via HMI
DE	[open] 2019-07-06 03:07:01 640	Security	SystemTags.HMI Control Operation	SEL performed control operation on Application. HMI_EDR1_TRIP_CLOSE operClear via HMI
vent Collection	<pre>[open] 2019-07-06 03:04:54 181</pre>	Security	SystemTags.User Logged On	SEL logged on device via ODBC
ve Data	<pre>[[open] 2019-07-06 03:04:52.456</pre>	Security	SystemTags.User Changed Settings	Time System modified settings
agnostics	[open] 2019-07-06 03:04:51 939	Security	SystemTags User Logged Off	SEL logged off device via ODBC

Time Synchronization? V

• IRIG-B In/Out

System

Proje Time Syste

POU

- NTP In/Out
- DNP In/Out
- PTP In
- Full range of offset and DST options

_Time_Contro				
t Properties	Tag Processor System_Time_Co	ontrol		
Component				
mTime	Setting	Value	Range	Description
Pin Settings	Demodulated_IRIG_B_Input	True	True,False	Demodulated IRIG B Input
oller	Enable_Global_UTC	False	True,False	Enable Global UTC
Uller	Set_System_Time_UTC_Offset	-300	-720 to 840	This setting sets the time difference between UTC and System Time in minutes.
	Enable_System_Time_DST_0	True	True,False	Enable System Time Adjustment for Daylight Saving Time
	Set_System_Time_DST_Offset	60	-120 to 120	Set System time Adjustment Amount for Daylight Saving Time
	Set_System_Time_DST_Start	Second	First,Second,T	System Time Daylight Saving Time start criteria - Week of Month
	Set_System_Time_DST_Start	Sunday	Sunday,Monda	System Time Daylight Saving Time start criteria - Day Of Week
	Set_System_Time_DST_Start	March	January, Febru	System Time Daylight Saving Time start criteria - Month
	Set_System_Time_DST_Start	02:00	00:00 to 23:59	System Time Daylight Saving Time start criteria - Time
	Set_System_Time_DST_Stop	First	First,Second,T	System Time Daylight Saving Time stop criteria - Week of Month
	Set_System_Time_DST_Stop	Sunday	Sunday,Monda	System Time Daylight Saving Time stop criteria - Day of Week
	Set_System_Time_DST_Stop	November	January,Febru	System Time Daylight Saving Time stop criteria - Month
	Set_System_Time_DST_Stop	02:00	00:00 to 23:59	System Time Daylight Saving Time stop criteria - Time
	Set_DNP_Failure_Timeout	10800	10-32767	Set timeout period to determine DNP time source failure
	Set_i870_Failure_Timeout	10800	10-32767	Set timeout period to determine i870 time source failure
	Enable_PTP_Power_Profile	False	True,False	Enable PTP Power Profile.
	Set_PTP_Transport	UDP	UDP,IEEE 802.3	Select the appropriate PTP network transport.
	Set_PTP_Domain	0	0-127	Select the appropriate PTP domain.
	Set_PTP_Path_Delay_Mecha	P2P	P2P,E2E	Select the appropriate Path Delay Mechanism.
	Set_PTP_Interface_1	None	None,Eth_01,E	Select the interface to listen to PTP traffic on.
	Set_PTP_Interface_2	None	None,Eth_01,E	Select the interface to listen to PTP traffic on.
	Apply_System_Time_UTC_Of	True	True,False	Apply System UTC Offset to all protocol data time setting instances.

Historical Trends?

- Two Options:
 - File I/O
 - TrendRecorder

T DATE/TIME		10	10 114	VA	VD	VC F_	WAIIS	QVANS							
2 DT#2015-10-29-14:01:22	268.9411	267.6455	267.831	0 26475.	9 26492.09	26484.39	21303450	-188144.5							
3 DT#2015-10-29-14:01:37	269.196	268.308	268.4689	0 26474.	2 26490.69	26484.93	21344010	-201261.8							
4 DT#2015-10-29-14:01:52	269.249	268.4834	268.4196	0 26474.	6 26490.33	26484.28	21347780	-248673.1							
5 DT#2015-10-29-14:02:07	269.1562	268.177	268.0399	0 26473.	.1 26490.22	26483.54	21326440	-266615.8							
6 DT#2015-10-29-14:02:22	269.0839	268.0688	267.8924	0 26475.	6 26491.49	26484.32	21318820	-268009.3							
7 DT#2015-10-29-14:02:37	269.0849	268.0602	267.9255	0 26475.	9 26491.83	26484.63	21319780	-267942.8							
8 DT#2015-10-29-14:02:52	268.9983	267.8549	267.6838	0 26473	.7 26490.11	26482.95	21304260	-267571.1							
9 DT#2015-10-29-14:03:07	268.9257	267.6919	267.5388	0 26474.	26491.49	26483.44	21295010	-264552.7							
10 DT#2015-10-29-14:0										Trend Recorder					
11 DT#2015-10-29-14:0															Sidneyr Demand (FOI 60)
12 DT#2015-10-29-14:0: 40000.0	000														System Demand (EOI,60)
12 DT#2015 10 29 14:0										T. cases.commerce.co.					Walt Demand (EOI,60)
14 DT#2015 10 29 14:0	000									6/23/2017 6:47:00 PM	0.636				
14 D1#2015-10-29-14.04										- System Demand (EOL60) : 310	33,300				
15 D1#2015-10-29-14:0 36000.0	000										22				
16 D1#2015-10-29-14:04									.	-					
17 D1#2015-10-29-14:0: 34000.0	000														
18 DT#2015-10-29-14:0!													M		
19 DT#2015-10-29-14:0! 32000.0	000									5	1		1		
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24 DT#2015-10-29-14:00						1				1	1	1		1.8	
25 DT#2015-10-29-14:0 26000.0	000		11	A		A	1		1			1		- IN I	
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31 DT#2015-10-29-14-01 2000.0	me		- F		1		1			N 1		1	1		
32 DT#2015-10-29-14:0			No.	1	Л		1	1				1	1		
22 DT#2015 10 29 14:01 18000 0	000		<u>101</u>		A.		1	1		11		1.			
33 DT#2015-10-29-14:0	1	Juli		k	W		1	L LA		man		Ju 1	r	1 /	
34 D1#2015-10-25-14.0:		A start		1			1	w				WW			
35 D1#2015-10-29-14:0: 100000		5			V			· ·				10		W MAR	
36 D1#2015-10-29-14:0		r												man .	
37 D1#2015-10-29-14:10															
38 DT#2015-10-29-14:10	000														
39 DT#2015-10-29-14:1(1200-0															
40 DT#2015-10-29-14:10															
41 DT#2015-10-29-14:1: 1000.0															
42 DT#2015-10-29-14:1:															
43 DT#2015-10-29-14:1: 8000.0	000														
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	ALL PLOT A DOT TO A DOT				4385NL			(2006).				10/2011/2010/07/2010/2010			

Historical Trends?

TrendRecorder Advantages

Filel/O Advantages

 Flexible (many use cases) Faster sampling (up to main task cycle time ~ 10ms) "Flat" files Integrated FTP support No additional software needed 	 Easy function block setup Utilizes database structure rather than flat files Custom data sets can be queried over custom time periods 192 analog points integrated
 FileI/O Disadvantages Requires programming and STRING manipulation No automated graph generation Number of inputs per file limited based on max STRING length (255) 	 TrendRecorder Disadvantages Requires TEAM Profile and TEAM Meter Reports Only analog trending No "flat" files

Event Capture?

- Automatically retrieve events from SEL IEDs
- Archive up to 512 events in RTAC database
- .CEV and COMTRADE
- Push new events to ACSELERATOR TEAM[®] SEL-5045
 Software







 For up to 254 SEL Relays directly polled by an RTAC, setting up Engineering Access takes 15 Seconds!

SEL_RTAC	1	Add Folder		Mind Ruy	21.972		
🗾 Tags	-	Add SEL Device	•	100 Series			
🖃 🂋 System	6	Add Other Device	•	200 Series	2010 10:51	:47 AM	
- Svs	5	Add from Device Store		300 Series	•		
- 🎲 Sys		Add Access Point		400 Series	•		
	->	Add Access Point Router		500 Series	•		
		Add Virtual Tag List		600 Series	•		
	1	Add	•	700 Series	•		
				2000 Series	•		
		Copy		2100 Series	•		
	2	Pename		2400 Series	•		
l	18	Kendine		2500 Series	•		
				3500 Series	3530		C37.118
							DNP
		Select 3500 fro	m SE	L,			Mirrored Bits

Human-Machine Interface? V



HMI Leverages RTAC Database



ACSELERATOR Diagram Builder[™] Live RTAC Data Points Available for Use



Troubleshooting?

Protocol	Remote Device	Interface	Туре	Baud Rate	RTS	CTS	Capture
Modbus Server	Server	Com01	232	19200	true	false	Start
Network Utilities							
IP Address:	Count: Timeout (seconds):						

Ethernet IED Report

Protocol	Remote Device	Interface	Capture
			All Ethernet
DNP Client	<u>SEL 421 1</u>	Eth_02	
DNP Client	<u>SEL 421 1</u>	Eth_02	
Modbus Client	SEL 3505 1 Client	Eth_02	V
Start			

Network Capture

There are no captures in progress.

- View networking diagnostics
- Ping devices
- Collect communications captures
- Retrieve passwords for connected devices
- Force data points for testing

Messaging? Alarm Emailer Extension = copy/paste

Course Providence														
Alarm_Emailer1	-													
Project Properties	Alarm_	Emailer 1												
Configure Alarm E	mailer (l	Rev: 2019-01-15)												
Settings	Drag a	a column header	here to group by that colum	in										
Email Destinations	Sett	ing	Value	Range	Description		Comn							
Alarms	Loca	A RTAC IP Address	192.168.1.2	Valid IP Address	Local RTAC Eth	hernet IP Address to issue er	nails from.							
Controller	SMT	P Server IP Address	192.168.1.10	Valid IP Address	SMTP IP Addre	ess to issue emails to.								
	Star	tup Delay	5	0-10	Alarm Suppress	s Starti in Delav (în mini ites)								
	FRO	M Email Address	a@b,com	String Value	FROM Alarm	Emailer 1								
	FRO	M Email Name	Alpha Bravo	String Value	FROM	-								
	Ema	il Subject Line	Alarm report	String Value	Subject Proj	ect Properties Alarn	n_Emailer1							
					Conf	figure Alarm Emailer	(Rev: 2019-01-	15)						
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Email Destina	tions	Enable D	ata Reference		Data Type	Group Assignment	Assert Text	PU Del	Deassert Text	DO Dela	Enable Optional Analog	Analog Tag	Analog DT	Ar
Alarms		True L	ED_Status.Barracada_52	A3P	SPS	Group 1	Tag Asserted	0	Tag Deasserted	0	On Assert	Barracada_Sort.CURRENT1	INS	
Controller		True U	ED_Status.Barracada_52	AA	SPS	Group 1	Tag Asserted	0	Tag Deasserted	0	On Assert	Barracada_Sort.CURRENT4	INS	
		True L	ED_Status.Barracada_52	AB	SPS	Group 1	Tag Asserted	0	Tag Deasserted	0	On Assert	Barracada_Sort.CURRENT5	INS	
		True L	ED_Status.Barracada_52	AC	SPS	Group 1	Tag Asserted	0	Tag Deasserted	0	False			
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		True L	ED_Status.Barracada_79	LOA	SPS	Group 5	Tag Asserted	0	Tag Deasserted	0	False			
		True L	ED_Status.Cypress_Pond	_52A3P	SPS	Group 6	Tag Asserted	0	Tag Deasserted	0	False			

Tag Asserted 0

Tag Asserted 0

The Accorted 0

Tag Deasserted 0

Tag Deasserted 0

Tag Descorted 0

False

False

Enlo

LED_Status.Cypress_Pond_52AA

LED_Status.Cypress_Pond_52AB

LED Status Cuproce Dand E2AC

SPS

SPS

CDC

Group 6

Group 6

True

True

Something custom you want to do?

-				Sync_Routine
TOP	_HS_TE	MP_CA	ALC	Project Properties Sync_Routine
Pro	ject Pro	opertie	Relay_1_Decoder	Program
B	1 2	PR VA	Project Properties EVENT_DECODER Relay_1_De Program	1 PROGRAM Sync_Routine 2 VAR 3 RTRIG1 : R_TRIG;
	3 4 5		1 PROGRAM Relay_1_Decoder 2 VAR 3 RELAY HIS 1 : EVENT DECOL	4 END_VAR 5
	6 7 8		4 END_VAR 5	2 ////ESTABLISHING INTERRUPT 3
-	9			s
	2			<pre> ///ESTABLISHING SUCCESSFUL SYNC SYNC SUCCESS := ISO 651R2 DNP.BI 00000 52A3P.stVal: </pre>
	3	// K2		8
	5			10 RTRIG1(CLK := INITIATE_SYNC);
	7	DE	make sure you put the .strVal at the en	11 12 TE BERIGLO = TRUE THEN
	8	11		13 //// SET BATTERY INVERTER VOLTAGE SETPOINT TO MATCH AVG VOLTAGE CALCULATED IN GRID MONITOR
	10	T_	SEL_651RA_1_SEL.CA_HIS_E	<pre>14 BATTERY_INVERTER_MODBUS.AC_VOLTAGE_SETPOINT.oper.setMag := (((GRID_TAGS.V_AVE.instMag)/50)*1.732); 15 BATTERY_INVERTER_MODBUS.AC_VOLTAGE_SETPOINT.opeR.trigger := TRUE;</pre>
	12	11		<pre>16 ELSE BATTERY_INVERTER_MODBUS.AC_VOLTAGE_SETPOINT.opeR.trigger := FALSE;</pre>
	13 14	DE		
	15	11		19 /// SET A LATCH TO RUN THE SYNC ROUTINE, ONLY INTERRUPTED BY TRIP CONDITION, TIMEOUT, OR SUCCESSFUL SYNC 20 SYNC LATCH (SET1 := RTRIGLO, RESET := (INTERRUPT SYNC OR SYNC SUCCESS OR T MAX)):
	17	CA		21
	18	// IF		<pre>22 GRID_TAGS.SYNC_ROUTINE_RUNNING.STVAL := SYNC_LATCH.Q1; 23 GRID TAGS.SYNC ELAPSED.instMag := t;</pre>
	20			24
	21		<pre>DELIA_HS_I := DELIA_HS; ///on first run, FIRSTRUN := FALSE;</pre>	25 26
	23	ENI	_ IF	27 ///WHEN WE'RE RUNNING SYNC, ESTABLISH SETPOINTS AND SEND CLOSE PERMISSIVE TO 651R2

Something custom you want to do?

- IEC 61131-3 Logic Engine empowers all of your "what if.." solutions
- Graphical, structured text, ladder
- Pre-built libraries
- RTAC Extensions

CEC

Home Current Outages Efficiency Tip Programs - Services -

Coastal Electric Cooperative

Your Touchstone Energy Cooperative K 🔀



MEMBERSHIP MATTERS

- 13 Substations
- Never had SCADA previously
- Started with 3530-4, Qty 2
- Later merged everything into 3555
- HMI, Trending, DA Scheme, Emailing, TEAM

Coastal Elec	tric System			
Ashepoo Substation Station kW = 0	Canadys Substation Station kW = 0	Ind. Park Substation Station kW = 0	Maple Cane Substation Station kW = 0	Neyles Substation Station kW = 0
Bennetts Point (11-3) 0 kW Jacksonboro (11-4) 0 kW	Pocket (3-2) 0 kW KOA (3-3) 0 kW Truck Stop (3-4) 0 kW	Pleasant Grove (12-1) 0 kW Mcleod (12-2) 0 kW Ind. Park (12-4) 0 kW Crescent (12-6) 0 kW	Kapstone (10-1) 0 kW Murray Mines (10-2) 0 kW	Prices Bridge (5-1) 0 kW Mashawville (5-2) 0 kW Parkers Ferry (5-3) 0 kW
Parnell Substation Station kW = 0	Pine Grove Substation Station kW = 0	Robinson Substation Station kW = 0	Sidneys Substation Station kW = 0	Smoaks Substation <i>Station kW = 0</i>
Rest Area (7-1) 0 kW Dr. Creek (7.2) 0 kW Cracker Barrel (7-4) 0 kW	PJ Nettles (4-1) 0 kW Sniders (4-3) 0 kW Hudson Mill (4-4) 0 kW	Red Oak (6-2) 0 kW Pierce Road (6-3) 0 kW Wesley Grove (6-4) 0 kW	Chestnut (8-1) 0 kW Forks Store (8-2) 0 kW PVC (8-4) 0 kW Sidneys Xrds (8-5) 0 kW	Johnsville (9-3) 0 kW Buckhead (9-4) 0 kW
Stevens Substation Station kW = 0 Rum Gully (2-1) 0 kW Ashton (2-2) 0 kW Garris (2-3) 0 kW Ruffin (2-4) 0 kW	Walterboro Substation Station kW = 0 Winchester (1-2) 0 kW CEC (1-3) 0 kW Longleaf (1-4) 0 kW Bells Hwy (1-5) 0 kW	Walterboro Bus Balls A PH 0.0 Volts A PH 0 B PH 0.0 Volts B PH 0 C PH 0.0 Volts C PH 0	Hury .0 Volts .0 Volts .0 Volts	
	Solar Farm Viper 0 kW Voltage A PH 0.0 AMPS A PH 0.0 B PH 0.0 AMPS B PH 0.0 C PH 0.0 AMPS C PH 0.0			
Line Devices	System One Line	Ckt Amps	Trend	
DA Scheme		System kW = Totalized Syster	= 0 n kW = 0	
Hyperlink				







-----Original Message-----From: SEL RTAC <RTAC@coastal.coop> Sent: Friday, October 26, 2018 12:07 PM To: SCADA <scada@coastal.coop>; Subject: EVENT DETECTED AT BennettsPoint 351R SEL

10/26/18 Time: 04:04:08.826 FDR 11-3 (BENNETTS POINT)

#	DATE	TIME	EVENT	LOCAT	CURR	FREQ	GRP	SHOT	TARGETS	
1	10/26/18	04:00:43.242	CG	20.36	328	59.99	1	2	11000000	10000000
2	10/26/18	04:00:39.170	CG	20.08	328	59.99	1	1	11000000	10000000
3	10/26/18	04:00:37.003	ER	\$\$\$\$\$\$\$	151	60.00	1	1	11000000	10000000
4	10/26/18	04:00:36.236	CG	20.19	326	60.00	1	0	11000000	10000000
5	10/19/18	03:26:54.598	TRIG	\$\$\$\$\$\$\$	17	60.01	1	0	11000000	10000000
6	10/19/18	02:08:41.432	TRIG	\$\$\$\$\$\$\$	14	60.01	1	0	11000000	10000000
7	10/19/18	01:53:56.432	TRIG	\$\$\$\$\$\$\$	15	60.01	1	0	11000000	10000000
8	10/16/18	05:47:36.563	TRIG	\$\$\$\$\$\$\$	31	60.00	1	0	11000000	10000000
9	10/11/18	07:12:44.339	ER	\$\$\$\$\$\$\$	210	59.99	1	2	11000000	10000000
10	10/11/18	07:12:42.080	CG	6.36	878	59.99	1	1	11000000	10000000



ElectriCities is a not-for-profit membership organization of municipally owned electric utilities that are spread across North Carolina, South Carolina, and Virginia.

We advocate for public power communities at the state and federal levels, and provide a number of administrative, technical, legal, and legislative services to support our members.

- Around 500 SEL-3505 RTACs at municipal stations and distributed generation sites
- Cellular uplink to Raleigh and Huntersville
- Central SEL-3555 RTACs for Eastern and Western NC for hosted SCADA

• Dispatch of diesel generation

- Scheduling and dispatch of peak shaving and load management
- Hosted HMI for member cities



		⊙ Tu	rn On PA	Gs - Main	○ Turn Off PA	AGs - Main
	Group Enabled	Generator Running	Breaker Status	Generator Name	Group Control	Manual Control
		۲		AlbHosp	🔘 In 🔘 Out	Start Stop
		۲		AlbPPP1	O In O Out	Start Stop
			0	AlbPPP2	O In O Out	Start Stop
				CheCH	O In O Out	Start Stop
		۲	0	DrexOC	O In O Out	Start Stop
				GasFrL2	O In O Out	Start Stop
				GasFrL3	O In O Out	Start Stop
lainoate		۲		GasPPP1	O In O Out	Start Stop
Middle				GasPPP2	O In O Out	Start Stop
			0	GrfWM	O In O Out	Start Stop
	۲	۲	۲	HptPolo	O In O Out	Start Stop
		0		HptRW1	O In O Out	Start Stop
		0	0	HptRW2	O In O Out	Start Stop
		0		LinHS	O In O Out	Start Stop
				MaidCC	O In O Out	Start Stop
	0	0		MonMS	O In O Out	Start Stop

Back to Main

	O Tur	n On Ne	wt TP	 Turn Off Newt TP
Group Enabled	Generator Running	Breaker Status	Generator Name	Group Control Manual Control
				Peak Shaving - DP2
۵		0	Firs Bkry1	In O Out Start Stop
	0	0	Firs Bkry2	O In O Out O Start O Stop
	0	0	Polymask/3M	In O Out Start Stop
	0	0	Sarstedt1	D In O Out O Start O Stop
	0	0	Sarstedt2	In O Out Start Stop
۵	0	0	CCJB1	In O Out Start Stop
۵	0	0	CCJB2	In O Out Start Stop
۵	0	0	ZF	In O Out Start Stop
۲	0		Prodelin	O In O Out O Start O Stop
				Peak Shaving - DP3 —
			Targ DC1	O In O Out O Start O Stop
0	0		Targ DC2	O In O Out O Start O Stop

Newton Standby Mode

Back to Main

	G	enerato	r Sched	uling Pa	ige		
PAGS	Generator Scheduling	En	ter Time ar	d duration	values before cl	cking SCHI	EDULE
PAGS DISABLED	SCHEDULE ENABLE SCHEDULE DISABLE	PAGS Month current value: 6 0.0	PAGS Day current value: 17 0.0	PAGS Hour current value: 14 0.0	PAGS Minute current value: 50 0.0	Duration Hours current value: 2 0.0	Duration Minutes current value: 10 0.0 value to write
LMVR	Generator Scheduling	Er	ter Time ar	nd duration	values before cl	icking SCHI	EDULE
LMVR DISABLED	SCHEDULE ENABLE SCHEDULE DISABLE	LMVR Month current value: 6 0.0	LMVR Day current value: 17 0.0	LMVR Hour current value: 13 0.0	LMVR Minute current value: 59 0.0	Duration Hours current value: 4	Duration Minutes current value: 1 0.0 value to write
TYPE1	Generator Scheduling	Er	iter Time ar	nd duration	values before cl	icking SCHI	EDULE
TYPE1 DISABLED	SCHEDULE ENABLE SCHEDULE DISABLE	TYPE1 Month current value: 6 0.0	TYPE1 Day current value: 17 0.0	TYPE1 Hour current value: 14 0.0	TYPE1 Minute current value: 55 0.0	Duration Hours current value: 2 0.0	Duration Minutes current value: 5 0.0 value to write
TYPE1	Other Generator Schedu	uling En	ter Time ar	nd duration	values before d	icking SCHI	EDULE
TYPE1 OTH DISABLED	SCHEDULE ENABLE	TYPE1 OTH Month current value: 6 0.0 value to write	TYPE1 OTH Day current value: 17 0.0 value to write	TYPE1 OTH Hour current value: 14 0.0 value to write	TYPE1 OTH Minute current value: 55 0.0 value to write	Duration Hours current value: 2 0.0	Duration Minutes current value: 5 0.0 value to write
NEWT	ON Generator Scheduling	g En	ter Time ar	nd duration	values before d	icking SCHI	EDULE
NEWTON DISABLED	SCHEDULE ENABLE	NEWTON Month current value: 6 0.0 value to write	NEWTON Day current value: 17 0,0	NEWTON Hour current value: 14 0.0	NEWTON Minute current value: 55 0.0 value to write	Duration Hours current value: 2 0.0	Duration Minutes current value: 5 0.0 value to write

Gen Schedule - Eastern Back to Main

- Creating custom user roles and privileges tied to HMI access
- Several small SCADA pages in one solution

Accounts		
List Users	Add New User	Change Your Password
Add User		
Username:		
System Roles:	User Roles:	
Administrator Engineer User Manager Monitor HMI Operator File Transfer	Custom1 Custom2 custom3 custom4 custom5 custom6	
Account Expi	ires	
Description:	1	
Password:	Confirm Pass	word
Complex Pass	sword led	

Submit

Cancel





What's the yearly support contract?



Questions?



The energy behind public power

www.electricities.com

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