

Citect Alarm Browser for ScadaPhone

Overview

To facilitate project configuration, ScadaPhone implements a **Citect Alarm Browser, CTAPILink**. This browser can reduce ScadaPhone project configuration from hours down to minutes when ScadaPhone is to be used in conjunction with **Citect SCADA**. The Citect Alarm Browser uses **Citect's CTAPI interface** (**CiTect Application Program Interface**) to obtain a list of all alarms configured in the Citect project and then facilitate the selection and configuration of alarms to be serviced by ScadaPhone.

In most cases, ScadaPhone communicates with SCADA servers via **OPC/OLE**; however, **Citect** has another, more customized, interface for client applications. Citect's custom interface is called **CTAPI** (**CiTect Application Program Interface**).

In order to interface with **CTAPI**, client applications must load the **CTAPI Dynamic Link Library** (**CTAPI.DLL**), establish a connection, and then request data via calls to functions defined within **CTAPI.DLL**.

The **DLL** interface is convenient, but it doesn't mesh well with ScadaPhone's **ScadaLink interface** which is built primarily on **OLE Automation**. To bridge this communications gap without adding undesired complexity to ScadaPhone's ScadaLink interface, the **CTAPILink** auxiliary application was created; CTAPILink loads the CTAPI.DLL to interact with Citect SCADA Runtime and simultaneously provides an OLE server interface for ScadaPhone's ScadaLink interface:



The **CTAPILink.exe** is an auxiliary application which should be installed separately from ScadaPhone.

CTAPILink usually does not need to be launched by the user or by any script; it is launched automatically whenever ScadaPhone needs to use it. The only exception is during initial system configuration, **CTAPILink** may need to be configured in order to locate the **CTAPI.DLL** file in **Citect's directory**

structure. To make sure that CTAPILink is properly configured to locate CTAPI.DLL, launch CTAPILink from the **Windows File Explorer**.

					- • •														
Computer 🕨 🚺	(C:)	ScadaTEC CTAPILink 3.1.6	▶ - •	Search 3.1.6	م														
Organize 👻 Include in library	•	Share with 🔻 New folder		:== -															
鷆 ScadaTEC	*	Name	Date modified	Туре	Size														
AsciiTagServer		🐌 ActivityLogs	1/25/2016 1:19 PM	File folder															
CLogViewer		3.1.6.2512.Version	8/12/2014 5:45 PM	VERSION File	1 KB														
	_	📚 CTAPILink.exe	8/12/2014 5:40 PM	Application	3,320 KB														
J.1.2		🛸 CTAPILink.ico	9/19/2012 12:09 PM	Icon	565 KB														
		_		_	_		_	_				_				💼 CTAPILink.ini	8/12/2014 5:57 PM	Configuration settings	1 KB
0.1.4																📄 CTAPILink.InstallationLog.txt	8/12/2014 5:45 PM	Text Document	3 KB
ModbusSimulator		🐝 UninstallCTAPILink.exe	8/12/2014 5:41 PM	Application	2,488 KB														
Modbus Tag Server	+ -	(III		4														
7 items																			

Configure ScadaLink Interface:

To access the **Citect Alarm Browser**, you must first configure ScadaPhone's **ScadaLink interface** to communicate with **Citect** via **CTAPILink**. To do this, launch ScadaPhone, create a new project, and configure the **ScadaLink Setup** as follows:

💆 ScadaPhone	
File Mode Options Window Logs Modem(s) V	Veb Server ScadaLink TTP Scheduler Session Help
C:\Users\optiplex760\Documents\ScadaTEC\ScadaPhone	\Projects\Ci Setup
Logs Alarms (0) Discretes (61) Analogs (2) Strings	s (0) Conta Status (15)
Eloat <u>N</u> ew <u>B</u> rowse Edit <u>P</u> lay De <u>l</u> ete Alarm Group Alarm Name	ScadaLink Setup Image: Constraint of the setup Interface Type ns DDE OPC OLE ScadaTec/Citect, CTAPILink Image: Constraint of the setup Selected Server ScadaTec/Citect, CTAPILink Server on remote machine Image: Constraint of the setup Remote Machine Name ScadaTEC, OPCHub (OLE) ScadaTEC, Asciit agServer ScadaTEC, Asciit agServer OK Cancel
	To have additional OLE servers added, contact ScadaTEC at 775-348-7471. OLE interfaces must be added by our programming staff.
12:49:35 Development Mode	OK Cancel

Selecting CTAPILink from the Main Menu

Next, select the Alarms tab on ScadaPhone's Main Window and click the Browse menu item to open the Alarm Browse Source Selector window:

ScadaPhone	
File Mode Options Window Logs Modem(s) WebServer ScadaLink TTP Scheduler Session Help	
C:\Users\optiplex760\Documents\ScadaTEC\ScadaPhone\Projects\Citect	
Logs Alarms (0) Discretes (61) Analogs (2) Strings (0) Contacts (0) Users (1) Menus (2) Wav Files (15)	
Eloat New Browse Edit Play Delete	
Alarm Group Alarm Name	
Alarm Browse Source Selector]
ScadaLink Setup TTP Client Setup	
Select the server connection you wish to browse	
Local ScadaPhone Tag Database	
ScadaLink connection: Citect SCADA	
12:37:15 Development Mode	н

Alarm Browser Source Selector

Choose the ScadaLink connection: Citect SCADA option from the Alarm Browse Source Selector.

f Citect SCADA Runtime is not active, you will see the following window:
CTAPILink.Open Unsuccessful
ScadaPhone was able to open CTAPILink, but CTAPILink was unable to open a link to Citect SCADA. This usually happens because Citect SCADA Runtime needs to be launched before attempting connection.
Current CTAPILink Config DLL Path C:\Program Files (x86)\Citect\CitectSCADA 7.20\Bin\CtApi.dll Host Computer Local Machine User Name / Password <blank></blank>
If Citect Runtime is active, the Current CTAPILink Config may not be correct; to make changes to the CTAPILink Config, click on the ShowCTAPILink button below to make changes.
If the connection failed simply because Citect Runtime is not active, launch Citect Runtime and then click the Retry button below.
Show CTAPILink Retry Cancel
CTAPILink Unsuccessful Message if Citect is not in Runtime

If **Citect SCADA Runtime** is *not active* when **CTAPILink** is launched, the status bar at the bottom of **CTAPILink's** main window will cycle through a repetitive countdown to the next connection attempt:

S CTAPI Link (version 4.1.2.506)						
Configure Machine List Search For CTAPIDIL Read Mode Disable Connection Attempts (5 mins) Logs						
DLL @ C\Program Files (u98)\Citect\Citect\SCADA 7 20\Bin\Citect						
Data Points Activity Log Performance Log Run Log Error Log						
<u>F</u> loat <u>L</u> og <u>O</u> therLogs						
2016/01/25 13:34:54.562 [0.003] Entering OpenCTAPI						
2016/01/25 13:34:54.564 [0.002] Current DLL location = 'C:\Program Files (x86)\Citect\Citect						
2016/01/25 13:34:54.566 [0.002] Calling LoadLibrary(CTAPI.DLL)						
2016/01/25 13:34:54.575 [0.009] LoadLibrary Succeeded						
2016/01/25 13:34:54.577 [0.002] CTAPI.DLL linkage complete						
2016/01/25 13:34:54.580 [0.003] Calling ctOpen('','','',0)						
2016/01/25 13:34:57.696 [3.116] ctOpen FAILED: Error #2 : The system cannot find the file sr						
2016/01/25 13:35:07.735 [10.039] Attempting connection to CTAPI						
2016/01/25 13:35:07.744 [0.009] Entering OpenCTAPI						
2016/01/25 13:35:07.751 [0.007] Current DLL location = 'C:\Program Files (x86)\Citect\Citect						
2016/01/25 13:35:07.759 [0.008] Calling LoadLibrary(CTAPI.DLL)						
2016/01/25 13:35:07.765 [0.006] LoadLibrary Succeeded						
2016/01/25 13:35:07.772 [0.007] CTAPI.DLL linkage complete						
2016/01/25 13:35:07.778 [0.006] Calling ctOpen('','','',0)						
2016/01/25 13:35:10.803 [3.025] ctOpen FAILED: Error #2 : The system cannot find the file sr						
▼						
13:35:12 Not Connected (Retry in 8 seconds)						

CTAPILink Not Connected

To configure the path to **CTAPI.DLL**, click on the **Search for CTAPI.DLL** menu item to open the following window:

🛸 CTAPI.DLL Locations					
CTAPILink needs to know the location of CitectSCADA's CTAPI.DLL file in order to connect with the SCADA system database. If there are multiple versions of CitectSCADA installed on this computer, it is important to make sure that CTAPILink is referencing the CTAPI.DLL that matches the version of CitectSCADA which will be in use.					
Listed below are all of the copies of CTAP has been installed to a non-standard locat of the hard drive(s) in order to locate all o	PI.DLL that CTAPILink is aware of. If t tion), click the "Search Drive(s)" butto copies of CTAPI.DLL.	iis list seems incomplete (e.g. if CitectSCADA n and CTAPILink will perform a complete scan			
To direct CTAPILink to use a particular co	ppy of CTAPI.DLL, simply put a check i	nark next to the appropriate list item below.			
DLL Version File Size File D	Date File Path				
 ✓ 7.20.0.598 114296 2010/ ■ 7.20.0.598 114296 2010/ 	/09/30 09:05:28 C:\Program Files (/09/30 09:05:28 C:\Program Files ((86)\Citect\CitectSCADA 7.20\Bin\CtApi.dll (86)\Common Files\Citect\CtApi.dll			
Se	earch Drive(s) OK C	ancel			

Search for Citect SCADA's CTAPI.DLL & Select a CTAPI.DLL that matches Citect SCADA Version

After the proper **CTAPI.DLL path** has been configured, launch **Citect SCADA Runtime**. The next screen assumes that the **Example** project that comes with **Citect SCADA** is running

🔋 Example - Citect Explorer		- • •
File View Tools Help		
Example	1 <u>4</u> ••••••••••••••••••••••••••••••••••••	2
Project List	Contents of Example	
🗐 My Projects	🛅 Graphics	
🖶 🕞 Example	📑 Tags	
🗄 📑 GrandForksSCADA	Alarms	
🗄 📑 TestPr	🧟 System	
	Communications	
	Cicode Files	
	CITECTVBA Files	
Ready	2	

Launch Citect SCADA Runtime

After **Citect Runtime** has launched, check the status bar at the bottom of **CTAPILink**'s main window; it should read "**Connected To Local Machine**":

Configure Machine List Search For CTAPLDLL Read Mode Disconnect Logs DLL @ C:\Program Files (x86)\Citect\CitectSCADA 7.20\Bin\CApidl Data Points Activity Log Performance Log Run Log Error Log Float Log Other Logs 2016/01/25 14:11:00.388 [0.009] PROCRAM START 2016/01/25 14:11:00.388 [0.009] PROCRAM START 2016/01/25 14:11:00.370 [0.007] Project Path: C:\ScadaTEC\CTAPLLink\4.1.2\CTAPLLink.exe 2016/01/25 14:11:00.929 [0.004] Entering OpenCTAPI 2016/01/25 14:11:00.929 [0.004] Entering OpenCTAPI 2016/01/25 14:11:00.968 [0.003] Adding DLL location = 'C:\Program Files (x86)\Citect\Citect 2016/01/25 14:11:00.975 [0.003] Calling Location to PATH environment variable 2016/01/25 14:11:01.054 [0.079] LoadLibrary CIAPLIDLL) 2016/01/25 14:11:01.059 [0.002] Calling ctOpen('','','','0) 2016/01/25 14:11:01.118 [0.059] ctOpen Succeeeded 2016/01/25 14:11:01.152 [0.034] Entering GetV7AlarmList (ClusterName='') 2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318,'Alarm','',0018F340,0) returned 05995 2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	📚 CTAPI Link (version 4.1.2.506) 👝 💷 💌					
DLL @ C.YProgram Files (x86)/Citect/CitectSCADA 7.20/Bin/CApi.dll Data Points Activity Log Performance Log Run Log Error Log Float Log Other Logs 2016/01/25 14:11:00.358 [0.009] PROGRAM START 2016/01/25 14:11:00.363 [0.005] EXE Path: C:\ScadaTEC\CTAPILink\4.1.2\CTAPILink.exe 2016/01/25 14:11:00.370 [0.007] Project Path: C:\ScadaTEC\CTAPILink\4.1.2 2016/01/25 14:11:00.925 [0.555] Attempting connection to CTAPI 2016/01/25 14:11:00.925 [0.004] Entering OpenCTAPI 2016/01/25 14:11:00.965 [0.003] Current DLL location = 'C:\Program Files (x86)\Citect\Citect 2016/01/25 14:11:00.968 [0.003] Adding DLL location to PATH environment variable 2016/01/25 14:11:00.975 [0.007] Calling LoadLibrary (CTAPI.DLL) 2016/01/25 14:11:01.057 [0.003] CTAPI.DLL linkage complete 2016/01/25 14:11:01.057 [0.003] CTAPI.DLL linkage complete 2016/01/25 14:11:01.118 [0.059] ctOpen Succeeded 2016/01/25 14:11:01.118 [0.059] ctOpen Succeeded 2016/01/25 14:11:01.152 [0.003] Athering GetV7AlarmList (ClusterName='') 2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318, 'Alarm ', ',0018F340,0) returned 05995 2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	Configure Machine List Search For CTAPI.DLL Read Mode Disconnect Logs					
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2016/01/25 14:11:00.975 [0.007] Calling LoadLibrary(CTAPI.DLL) 2016/01/25 14:11:01.054 [0.079] LoadLibrary Succeeded 2016/01/25 14:11:01.057 [0.003] CTAPI.DLL linkage complete 2016/01/25 14:11:01.059 [0.002] Calling ctOpen('','','',0) 2016/01/25 14:11:01.118 [0.059] ctOpen Succeeded 2016/01/25 14:11:01.152 [0.034] Entering GetV7AlarmList (ClusterName='') 2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318,'Alarm','',0018F340,0) returned 05995 2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	2016/01/25 14:11:00.968 [0.003] Adding DLL location to PATH environment variable					
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2016/01/25 14:11:01.057 [0.003] CTAPI.DLL linkage complete 2016/01/25 14:11:01.059 [0.002] Calling ctOpen('','','',0) 2016/01/25 14:11:01.118 [0.059] ctOpen Succeeded 2016/01/25 14:11:01.152 [0.034] Entering GetV7AlarmList (ClusterName='') 2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318,'Alarm','',0018F340,0) returned 05995 2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	2016/01/25 14:11:01.054 [0.079] LoadLibrary Succeeded					
2016/01/25 14:11:01.059 [0.002] Calling ctOpen('','','',0) 2016/01/25 14:11:01.118 [0.059] ctOpen Succeeeded 2016/01/25 14:11:01.152 [0.034] Entering GetV7AlarmList (ClusterName='') 2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318,'Alarm','',0018F340,0) returned 05995 2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	2016/01/25 14:11:01.057 [0.003] CTAPI.DLL linkage complete					
2016/01/25 14:11:01.118 [0.059] ctOpen Succeeeded 2016/01/25 14:11:01.152 [0.034] Entering GetV7AlarmList (ClusterName='') 2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318,'Alarm','',0018F340,0) returned 05995 2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	2016/01/25 14:11:01.059 [0.002] Calling ctOpen('','','',0)					
2016/01/25 14:11:01.152 [0.034] Entering GetV7AlarmList (ClusterName='') 2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318,'Alarm','',0018F340,0) returned 05999 2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	2016/01/25 14:11:01.118 [0.059] ctOpen Succeeeded					
2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318,'Alarm','',0018F340,0) returned 05995 2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	2016/01/25 14:11:01.152 [0.034] Entering GetV7AlarmList (ClusterName='')					
2016/01/25 14:11:01.176 [0.017] AlarmCount = 29	2016/01/25 14:11:01.159 [0.007] ctFindFirst(055CA318,'Alarm','',0018F340,0) returned 05995					
	2016/01/25 14:11:01.176 [0.017] AlarmCount = 29					
	•					
	1422-06 Connected Tell contraction					

Verify that CTAPILink is Connected to Local Citect SCADA

After the initial setup, manually launching **CTAPILink** will not be necessary; the **CTAPILink Install program** inserts the proper OLE Server linkage into the Windows Registry and whenever a program such as ScadaPhone requests a connection to **CTAPILink**, Windows will launch it automatically.

If you left ScadaPhone paused on the **CTAPILink.Open Unsuccessful** window shown previously in this application note, you can now click the **Retry** button; otherwise, repeat the process of clicking the **Browse** menu item from ScadaPhone's **Alarms** tab and selecting **ScadaLink connection: Citect SCADA** from the Alarm Browse Source Selector.

After ScadaPhone successfully obtains the **alarm information** from **Citect** via **CTAPILink**, and depending upon your project's utilization of **Citect Clusters**, you may be presented with the following prompt:



Citect Cluster Prompt

In this example, this window has been triggered because the **Example** project only has one cluster defined; therefore, ScadaPhone could obtain tag values by simply using the tag name. Citect projects containing **multiple clusters** require ScadaPhone to reference tags by **cluster name plus tag name** (e.g. **Cluster1.AnalogTag1**). This prompt is allowing you to choose whether or not ScadaPhone should use the **Cluster Name**.

If you are building a project in phases, and you know that there will be additional clusters added at a future date, choose **Yes**; this makes ScadaPhone project expansion much easier when future clusters are added to your Citect project. If you know that there will never be any other clusters, you can choose **No**. When browsing the **Example**, choose **No**. You should now see the **Citect Alarm Browser** window:

💋 Citect Alarm Browser	
Digital Analog Advanced Time Stamped Multi Digital	Alarm Category Filter
ALARM_1 ALARM_10 ALARM_2 ALARM_2 ALARM_3 ALARM_4 ALARM_5 ALARM_6 ALARM_7 ALARM_7 ALARM_8 ALARM_9	Category 0 (29)
Show Tags Already Being Referenced Select All Clear All	
OK Cancel	

Citect Alarm Browser (Digital Tags Tab)

Note that the **Citect Alarm Browser** has individual tabs to segregate the different types of alarms available in Citect. In the previous image, the **Digital** tab is selected, so the list contains only **Digital** type alarms. To see the other types of alarms, click the appropriate tab:

💋 Citect Alarm Browser	
Digital Analog Advanced Time Stamped Multi Digital	Alarm Category Filter
Bed_Depth LOOP_1_SP Temp	☑ Category 0 (29)
Show Tags Already Being Referenced Select All Clear All	
OK Cancel	

Citect Alarm Browser (Analog Tags Tab)

Note that the list of **Digital** alarms has been replaced by the three **Analog** alarms defined in the **Example** project. Note that the **Alarm Category Filter** on the right side of the browser shows that there is only one **Alarm Category** defined in the **Example** project (**Category 0**). Larger projects with multiple categories, removing a check-mark (\checkmark) from a low-priority category of alarms will narrow the selection list and facilitate the browsing process. Note that the number in parenthesis after the category name indicates the number of alarms defined in each category; in this example, there are **29** alarms in **Category 0**.

To select alarms that you want to include in your ScadaPhone project, simply put a check-mark next to the alarm names in the selected list:

💋 Citect Alarm Browser	
Digital Analog Advanced Time Stamped Multi Digital	Alarm Category Filter
V ALARM_1 ALARM_10 V ALARM_2 V ALARM_3 V ALARM 3 V ALARM 4 Z ALARM 6 ALARM 8 ALARM 9	Category 0 (29)
Show Tags Already Being Referenced Select All Clear All	

Selecting Alarms to be incorporated into ScadaPhone

After all of the desired alarms have been selected with check-marks, clicking the **OK** button at the bottom of the **Citect Alarm Browser** window will move the browsing process to the next phase:

Alarm Message Generation:

💈 Alarm Message Generator				
The alarms you've just selected combination of the Name, Desc	d need to have their text and/or v c., and Comment fields from each	voice messages configur n alarm to generate uniqu	red. ScadaPhone can use any ue messages for each alarm.	
When generating alarm Image: Alarm.Name Specify the order in which you want these fields to be checked here> Alarm.Dasc Alarm.Comment Marm.Comment Image: Alarm.Comment Alarm.Comment Alarm.Dasc Alarm.Dasc				
Alarm Message Preview List (sele	ct items to accept or edit)			
Alarm Name	Alarm Messag	e		
ALARM_1 Notor 1 Overheated Motor Number 1 has overheated ALARM_10 Notor 5 Low 0il Motor Number 5 has low oil ALARM_2 Notor 1 Low 0il Motor Number 1 has low oil ALARM_3 Notor 2 Overheated Motor Number 2 has low oil ALARM_4 Notor 2 Low 0il Motor Number 2 has overheated ALARM_5 Notor 2 Low 0il Motor Number 2 has low oil ALARM_6 Notor 3 Overheated Motor Number 3 has low oil ALARM_7 Notor 3 Low 0il Motor Number 3 has low oil ALARM_8 Notor 4 Overheated Motor Number 4 has overheated ALARM_7 Notor 4 Low 0il Motor Number 4 has overheated ALARM_8 Notor 5 Overheated Motor Number 5 has overheated ALARM_9 Notor 5 Overheated Motor Number 5 has overheated Bed_Depth Bed_Depth Alarm <i>LOW</i> Entry_Fault_Multi Entry Fault Multidigital Alarm for E + Use <ctrb <shift="" and=""> to select multiple items -or- Click Here to select all -or- Click Here to select using wildcard</ctrb>				
Courseled Alarm Alleite				
Alarm Group	es Explanatio	n		
General		 Explanation 	1	
Aram Priority Stroadcast Priority High Priority O Low Priority Very High Priority Normal Priority Very Low Priority				
Image: Constraint Constr				
Close				

Alarm Message Generator – All 3 Fields Selected

The **Alarm Message Generator** provides the means for selecting the messages used by ScadaPhone The process will generate both a SMS message for each alarm and a Voice Wav file that will be used to announce the alarm. In well-defined projects, a suitable message can usually be found in the **Alarm.Desc** or **Alarm.Comment** field. The **Alarm Message Generator** makes an attempt to identify which field has the most verbose and unique messages; if there is a clear choice, the alarm field check marks and field sequence list will be set accordingly.

The **Example** project provides a good example of how to use the field sorting and filtering features.

At the beginning of the message-generation process, all 3 field-selection check-marks are selected (which results in some awkwardly-worded and redundant alarm messages). So, the next step is to set the field-selection check-boxes to see which pattern yields the best messages.

In the previous image, **ALARM_1** through **ALARM_10** have acceptable messages in the **Alarm.Name** field (in blue font); therefore, removing the check-marks from the **Alarm.Desc** and **Alarm.Comment** boxes yields acceptable messages for these alarms:

💋 Alarm Message Generator					• ×
The alarms you've just select combination of the Name, D	cted need to have their text esc., and Comment fields f	t and/or voice rom each ala	e messages configu m to generate uniq	red. ScadaPhone can use a ue messages for each alarm.	iny
When generating alarm messages, use the fields checked here>	✓ Alarm.Name Alarm.Desc Alarm.Comment	Specify th you want arranged	e order in which these fields to be n the message>	Alarm.Name	[↓]
Alarm Message Preview List (s	elect items to accept or ed	it)			
Alarm Name	Alam	n Message			
ALARM 1	Moto	r 1 Overk	eated		
ALABM 10	Moto	r 5 Low C	il		Ê.
ALABM 2	Moto	r l Low C	i 1		
ALABM 3	Moto	r = 2 Overk	eated		E
ALABM 4	Noto	r 2 Low-C	il		
ALABM 5	Moto	r 3 Overb	eated		
ALABM 6	Moto	r 3 Low C	i1		
ALARM 7	Moto	r 4 Overk	eated		
ALARM 8	Moto	r 4 Low C	il		
ALARM 9	Moto	r 5 Overk	 eated		
Bed Depth	Bed	Depth			
Entry_Fault_Multi	Entr	y Fault F	ultidigital		-
Use <ctrl> and <shift> to select mul</shift></ctrl>	tiple items -or- Click Here to :	select all -or-	Click Here to select (using wildcard	
Accept Selected Items	Manually Edit Select	ed Items	Use Default (Alar	m. TagName) Alarm Message	e(s)
Generated Alarm Attri	outes				
Alarm Group	E	Explanation			
General		•			
			Explanation	n	
Alarm Priority					
 Broadcast Priorit 	y 💿 High Priority	🔘 Lov	v Priority		
Very High Priority	 Normal Priority 	🔘 Ver	y Low Priority		
Generate Acknow Explanation	ledgement Tags 📃 Se Ex	t AutoAck Op Internation	otion 📝 Gener Explai	ate Run Time Enable Tags nation	
		Close]		

Better Formatted Alarm Messages

This selection has produced 10 suitably-worded alarm messages which are shown highlighted above. Clicking **Accept Selected Items** will add them to the ScadaPhone project, remove them from the **Alarm Message Generator** list and reevaluate the field suggestions for the remaining items.

The **Generated Alarm Attributes** are applied to each accepted alarm. The recommended settings are selected by default and there is really no need to change these settings during this process.

In the remaining items, note that the **Alarm.Comment** field has not been set in the **Example** project, so the check-mark in the **Alarm.Comment** field-selector has been omitted. The remaining fields still produce a list of awkward and redundant messages:

💈 Alarm Message Generator			
The alarms you've just select combination of the Name, De	ed need to have their tex sc., and Comment fields	t and/or voice messages config rom each alarm to generate un	gured. ScadaPhone can use any ique messages for each alarm.
When generating alarm messages, use the fields checked here>	 Alarm. Name Alarm.Desc Alarm.Comment 	Specify the order in which you want these fields to be arranged in the message>	Alarm.Name Alarm.Desc
Alarm Message Preview List (se	ect items to accept or ed	it)	
Alarm Name	Alarr	n Message	
Bed_Depth	Bed	Depth 10W	
Entry_Fault_Multi	Entr	y Fault Multidigital	Multidigital Alarm for Entry Faults
Feed_SPC_1	Frea	le. X freak value	
Feed_SPC_10	XEri	atic X points widely fluctua	iting
Feed_SPC_11	X St	ratification X hugging	centre line
Feed_SPC_12	XMix	X hugging control limits	
Feed_SPC_13	ROut	sideCL <i>R outside control lin</i>	nits
Feed_SPC_14	RAbo	veucl R points above UCL	
Feed_SPC_15	RBel	owLCL R points below LCL	
Feed_SPC_2	X0ut	sideCL Xoutside control lin	NIS
Feed_SPU_3	X AL	ove UCL X points above UC	
	X Be	Tow LCL X points below ICA	L 1
Feed_SFC_S	XUUT	sidewi <i>X ouside Marinig</i> m	mus
Feed SPC 7	XUpi	rend X points decreasing	
Feed SPC 8	XGrs	dualUn X points above mea	an l
Feed SPC 9	XGrs	dualDn X points below mea	0
LOOP 1 SP	Setr	oint HIGH HIGH	
Temp	Temp	erature <i>LOWLOW</i>	
Use <ctrl> and <shift> to select multip</shift></ctrl>	ole items -or- Click Here to	select all -or- Click Here to selec	et using wildcard
Accept Selected Items	Manually Edit Selec	ed Items Use Default (Al	larm. TagName) Alarm Message(s)
Generated Alarm Attribu	ites		
Alarm Group		Explanation	
General		▼ Evplanat	ion
Alarm Priority		E spiariae	
Broadcast Priority	Migh Priority	C Low Priority	
Very High Priority	 Normal Priority 	 Very Low Priority 	
Generate Acknowle Explanation	dgement Tags 🛛 🕅 Se E	et AutoAck Option 🛛 🖾 Gen Replanation Exp	erate Run Time Enable Tags Ianation
		Close	

Alarm Message Generator – 2 Fields Selected

The **Feed_SPC_*** alarms look as though the **Alarm.Desc** fields (in green font) would make the most descriptive alarm messages, so the best action at this point would be to remove the check-mark from the **Alarm.Name** field-selector, highlight all of the **Feed_SPC_*** items, and click the **Accept Selected Items** button.

Manually Editing Alarm Messages:

After the **Feed_SPC_*** alarms have been accepted, the only items remaining from the **Example** project are **3 Analog** alarms and **1 Multi-Digital** alarm:

💈 Alarm Message Generator 📃 📼 📼
The alarms you've just selected need to have their text and/or voice messages configured. ScadaPhone can use any combination of the Name, Desc., and Comment fields from each alarm to generate unique messages for each alarm.
When generating alarm messages, use the fields checked here> Image: Alarm.Name generating alarm message messa
Alarm Message Preview List (select items to accept or edit)
Alarm Name Alarm Message
Bed_Depth 10W Bed_Depth_Bed_Depth Alarm
Entry_Fault_Multi Multidigital Alarm for Entry Faults Entry Fault Multidigital Entry Faults
LOOP_1_SP HIGH HIGH Setpoint Setpoint Alarm
Temp IOWIOW Temperature Temperature
Accept Selected Items Manually Edit Selected Items Use Default (Alarm.TagName) Alarm Message(s) Generated Alarm Attributes Alarm Group Explanation
General 👻
Explanation
Alarm Priority
Broadcast Priority High Priority Low Priority
Very High Priority @ Normal Priority @ Very Low Priority
Image: Set AutoAck Option Image: Set AutoAck Option Image: Set AutoAck Option Explanation Explanation Explanation
Close

Small Number of Alarm Messages Can be Manually Edited

In this group, the **Alarm.Comment** field (brown font) appears to be the best selection; however, the brown-text captions could be improved upon with some minor manual editing.

To manually edit the remaining messages, click the small label reading **Click Here to select all** and then click the **Manually Edit Selected Items** button.

Manually Edit Alarm Messages	
Enter a text/voice message for the	following alarm:
Bed_Depth	Manually Edit Alarm Messages
Bed Depth Alarm	Enter a text/voice message for the following alarm:
OK New	Entry_Fault_Multi
	Electrical Building Entry Fault
Manually Edit Alarm Messages	following alarm:
LOOP_1_SP	Manually Edit Alarm Messages
Loop 1 Setpoint Alarm	Enter a text/voice message for the following alarm:
	Temp
	Temperature Alarm
	OK, Next Skip, Next Cancel

Manually Edit Alarm Messages

So far this document has described the **Accept Selected Items** and **Manually Edit Selected Items** methods for setting alarm messages in alarms obtained from a Citect CTAPI Alarm Browser.

The third and final option for setting the alarm messages is the **Use Default (Alarm.TagName) Alarm Message(s)** button; this is the most simplistic way to accept alarms browsed from Citect, but the drawback to using this method is that the generated alarm messages are not as descriptive as can be derived from the other acceptance methods. After all of the items in the **Alarm Message Preview List** have been accepted and the list is empty, the **Alarm Message Generator** window will *automatically close* and focus will return to the main window. Note that there is not a 1-to-1 correspondence between the number of Citect alarms accepted and the number of ScadaPhone alarms produced; **Analog** and **Multi-Digital** Citect alarms are supported in ScadaPhone via the use of **Computed Tags** which produce **Discrete** bit-values by masking status bits out of the Citect **Alarm.State** field. The actual alarm-and-tag count produced is as follows:

- Digital, Advanced, and Time-Stamped alarms produce: 1 discrete alarm and 4 discrete tags
- Analog alarms produce: 7 discrete alarms, 10 discrete tags and 1 analog tag
- Multi-Digital alarms produce: 8 discrete alarms, 11 discrete tags and 1 analog tag

🛃 Analogs (4)	Discretes (141)	- • ×
Main Window Dock New Properties Modify Value	Main Window Dock New Properties Modify Value	:
Find References	Find References	
Type Tag Name Value	Type Tag Name Value	
OLE Bed Depth.State 0	CMP ALARM_8.RTEnable 1	
OLE Entry Fault Multi.State 0	OLE ALARM_9.Ack 1	
OLE LOOP_1_SP.State 0	OLE ALARM_9.Disabled 0	
OLE Temp.State 0	OLE ALARM_9.On 1	
	CMP ALARM_9.RTEnable 1	
💋 Alarms (54)	OLE Bed_Depth.Ack 1	
Main Window Dock New Browse Edit Play Delete	CMP Bed_Depth.DeviationHighAlarm U	
Alarm Group Alarm Name	Red Depth DeviationLowAlarm 0	
General (54) ALARM 5.0n	CMP Bed Depth HighAlarm	
7 ALARM_6.On	CMP Bed Depth High High Alarm 0	
ALARM_7.On	CMP Bed Depth.LowAlarm 1	=
9 ALARM_8.On	CMP Bed_Depth.LowLowAlarm 0	
10 ALARM_9.On	CMP Bed_Depth.RateOfChangeAlarm 0	
11 Bed_Depth.DeviationHighAlarm	CMP Bed_Depth.RTEnable 1	
12 Bed_Depth.DeviationLowAlarm	CMP Entry_Fault_Multi.000 0	
13 Bed_Depth.HighAlarm	CMP Entry_Fault_Multi.00A 0	
14 Bed_Depth.HighHighAlarm	CMP Entry_Fault_Multi.0B0 0	
15 Bed_Depth.LowAlarm	CMP Entry_Fault_Multi.0BA 0	
17 Bed_Depth.cow.cow.xiaim	OLE Entry_Fault_Multi.Ack 1	
18 Entry Fault Multi.000	CMP Entry_Fault_Multi.COU 0	
19 Entry_Fault_Multi.00A	CMP Entry Fault Multi CB0	
20 Entry_Fault_Multi.0B0	CMP Entry Fault MultiCBA	
21 Entry_Fault_Multi.0BA	OLE Entry Fault Multi.Disabled 0	
22 Entry_Fault_Multi.C00	CMP Entry Fault Multi.RTEnable 1	
23 Entry_Fault_Multi.COA	OLE Feed_SPC_1.Ack 1	
24 Entry_Fault_Multi.CB0	OLE Feed_SPC_1.Disabled 0	
25 Entry_Fault_Multi.CBA	OLE Feed_SPC_1.On 0	
26 Feed_SPC_1.On	CMP Feed_SPC_1.RTEnable 1	
Zr Feed_SPC_10.0h	OLE Feed_SPC_10.Ack 1	T
20 Feed_SPC_11.0n	🔲 Filter List	

Alarm Browse Results

This scheme does increase the tag-count, but it does a very good job of tracking the *actual* Citect **Alarm.State** status.

Another reason for splitting the **Citect Analog** and **Multi-Digital** alarms into multiple **Discrete ScadaPhone** alarms is compatibility: Citect implements some alarm types that ScadaPhone does not *directly* support; ScadaPhone's **Computed Tags** feature provides a means to bridge this gap. To see how this is implemented, click the **Discretes** tab, highlight any of the Computed Tags associated with any Analog or Multi-Digital Alarm:



Computed Tags

The computed tags driving the **Citect Analog/ScadaPhone** Discrete alarm bits use the bit masked value maintained in the Citect **Alarm.State** field. When the alarm is active in Citect, the **4th bit** in the **State** bit mask is a '**1**'; ScadaPhone implements a discrete-logic operator called **EQMASK** to test bit-statuses at runtime. The **EQMASK** operator takes two analog values as input arguments and returns a discrete result: **<RESULT> = <ARG1> EQMASK <ARG2>**.

Note that ScadaPhone analogs are all stored as *floating-point* numbers; therefore, when evaluating expressions that require *integer* inputs (such as **EQMASK**, **DIV**, and **MOD**), the floating point values are *rounded* to the nearest **32-bit integer** before the integer-based operation is performed.

In the previous image of **Tag Properties**, the first part of each **AND** expression is checking to see if **bit 4** is a **1** (meaning the alarm is *active* in Citect).

The second half of each computed tag expression, (Alarm.State mod 8 = x), narrows down the *type* of alarm that is active.

The Citect **Alarm.State** bit-mask uses the last **3** bits to specify the type of alarm. ScadaPhone recognizes 7 different Citect Analog Alarm types:

```
(Alarm.State EQMASK 8) and (Alarm.State mod 8 = 0) Deviation High
(Alarm.State EQMASK 8) and (Alarm.State mod 8 = 1) Deviation Low
(Alarm.State EQMASK 8) and (Alarm.State mod 8 = 2) Rate of change
(Alarm.State EQMASK 8) and (Alarm.State mod 8 = 3) Low
(Alarm.State EQMASK 8) and (Alarm.State mod 8 = 4) High
(Alarm.State EQMASK 8) and (Alarm.State mod 8 = 5) LowLow
(Alarm.State EQMASK 8) and (Alarm.State mod 8 = 6) HighHigh
```

The 7 specific alarm states are differentiated in the ScadaPhone alarm messages by using the **alarm message** accepted in the **Alarm Message Generator** as a **message prefix** and the specific state as a **message suffix**:



Generating Text & Voice Messages

Citect's Multi-Digital alarms are implemented similarly to the Citect Analog alarms; each Citect state is identified by using bit-mask operators on the **Alarm.State** field:

(Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 0) State 000 (Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 1) State 00A (Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 2) State 0BO (Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 3) State 0BA (Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 4) State COO (Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 4) State COO (Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 5) State COA (Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 6) State CBO (Alarm.State EQMASK 2048) and (Alarm.State mod 8 = 6) State CBO

The A, B, and C states refer to the bit pattern created by the **Var Tag A**, **Var Tag B**, and **Var Tag C** inputs to the **Citect Multi Digital** alarm. For example, the **Entry_Fault_Multi** alarm browsed from Citect's Example project is defined in the Citect Project Editor as follows:

🛄 Multi-Digital Alarms [Example]						
Alarm Tag	Entry_Fault_Multi			A		
Cluster Name		▼				
Alarm Name	@(Entry Fault M	@(Entry Fault Multidigital)				
Alarm Desc	@(Multidigital Alarm for Entry Faults)					
Var Tag A	Entry_Fault_State0				•	
Var Tag B	Entry_Fault_State1				-	
Var Tag ⊂	Entry_Fault_State2				-	
Realarm						
State 000		0		State 00A	@(SM-A1)	1
State 0B0	@(SM-A2)	1		State OBA	@(SM-A3)	1
State C00	@(SM-A4)	1		State COA	@(SM-A5)	1
State CB0	@(SM-A6)	1		State CBA		0

This setup corresponds to the following table:

	Var Tag A Entry_Fault_State0	Var Tag B Entry_Fault_State1	Var Tag C Entry_Fault_State2
000	0	0	0
00A	1	0	0
0B0	0	1	0
0BA	1	1	0
C00	0	0	1
C0A	1	0	1
CB0	0	1	1
CBA	1	1	1

ScadaPhone's **Citect Alarm Browser** ensures that each **Discrete** alarm in ScadaPhone identifies the **Citect "CBA" state** in both the **Text** and **Voice** alarm messages:

Text message for email/alpha-numeric pagers (optional) Syntax Help Multi-Line Edit
Electrical Building Entry Fault State 00A. Browse
Display Format : Electrical Building Entry Fault State 00A
Voice Message Composition
WavFile(Electrical Building Entry Fault) WavFile(State 00A)
Text message for email/alpha-numeric pagers (optional) Syntax Help Multi-Line Edit
Electrical Building Entry Fault State 0B0 Browse
Display Format : Electrical Building Entry Fault State OBO
Voice Message Composition
WavFile(Electrical Building Entry Fault) WavFile(State 0B0)
Text message for email/alpha-numeric pagers (optional) Syntax Help Multi-Line Edit
Electrical Building Entry Fault State CBA Browse
Display Format : Electrical Building Entry Fault State CBA
Voice Message Composition
WavFile(Electrical Building Entry Fault) WavFile(State CBA)



All other Citect alarms are simply implemented as discrete alarms which are triggered by the value of the **Alarm.On** field obtained from Citect at runtime:



Typical Generated Alarm Configuration

Note that the message "*Motor 4 Low Oil*" which was accepted in the **Alarm Message Generator** has been inserted into both the **Text Message** and the **Voice Message** for this alarm. Also note that the **Ack Tag** was also automatically configured by the browser (because the **Generate Acknowledgement Tags** option was selected in the **Alarm Message Generator** when the first batch of digital alarms were accepted.

ScadaPhone's Citect Alarm Browser can save many hours of configuration time when **ScadaPhone** is being used in conjunction with *large* Citect projects.