

IP-network Connected Cell Router Configuration In ScadaPhone

OVERVIEW:

One of the alarm-reporting methods supported by ScadaPhone is **SMS text messaging over IP-network-connected cellular modems**. The command interface for these modems is very similar to the cellular modems which connect via **RS-232 or USB serial** cables; however, due to the fundamental differences between the physical connection to the ScadaPhone host computer, ScadaPhone has separate configuration controls for **IP-Network-Connected** and **Serial-Connected** modems.

Before Starting ScadaPhone Configuration

IP Modems require some manufacturer-specific configuration steps before they are ready to function within your cellular provider's network and with ScadaPhone. If these steps are not completed successfully, ScadaPhone's IP Modem interface will not function properly.

It may also be necessary to configure the modem to run in a mode which is different than the factory default. For example, the **MultiTech MTR-XXXX** has a *factory default* setting which enables **PPP** connections; however, ScadaPhone needs the MTR-XXXX to be enabled for **Telnet Radio Access** via Port **5000** (and the **PPP** mode must be *disabled*).

To make this configuration change, you will need to open the modem's **internal setup utility** which can be accessed as a **web page interface via any HTTP browser** such as Google Chrome, Mozilla Firefox or Microsoft Edge. Typically, the modem setup interfaces are accessed by simply typing the **modem's IP address** into the web browser's address or location bar and logging into the device.

It is strongly advised that you use the modem's internal setup utility to test the modem's connectivity to the cellular network by sending a test SMS to your mobile phone. Once that is working, you can then proceed to setting up ScadaPhone's connection to the modem.

ScadaPhone Configuration

Both varieties of modem connections are configured from within ScadaPhone's **Modem Configuration** window; the Serial-Connected modem settings are contained within the **Cellular Modem Configuration** group box, the IP-Network-Connected modem settings are contained within the **IP Modem Configuration** group box:

💋 Scad	aPhone								_		×
File Mo	ode Options	Window	Logs	Modem(s)	Web Server	ScadaLink	ттр	Scheduler	Session	Help	
C:\Scada	TEC\ScadaPho	one\Project	s\Citect	Moder	m Configurati	on	1				
Logs	Alarms (405)	Discretes	(510) A	Voice I	Modem		Users	(1) Menus	(2) Wav	Files (11	8)
Float N	<u>l</u> ew <u>B</u> rowse	Ed <u>i</u> t <u>P</u> lay	De <u>l</u> ete	Cellula	ar Modem						
Alarm (Group	Alarm	n Name	IP Mod	dem						
Gener	Modem Confi	iguration									
3	Voice Mod	lem Confi	guratio	n							
- 4	Enable \	/oice Mode	m Inter	face Dis	abled				S	how Mo	dem Log
5	Voice Mode	em Port Nu	mber	N/A							
7	Modem mo	del detect	ed: N/A	4					Igno	re <dle< th=""><th>E>d codes</th></dle<>	E>d codes
6	Force m	nodem mod	del: N/A	4					Igno	re <dle< td=""><td>E>o codes</td></dle<>	E>o codes
10											
11	-Cellular M	odem Con	figurat	ion							
12	12 Enable Cellular Modern Interface Show Modern Lo						dem Log				
- 14	Cellular Mod	dem Port N	umber	N/A							
15	Modem mo	del detect	ed: N/A	A					_ 1	ignore C	TS Signal
11:11:55	SMS Servic	e Center N enath: 160	umber:	<optiona< th=""><th>L></th><th></th><th></th><th></th><th></th><th>Lock Po</th><th>rt Setting</th></optiona<>	L>					Lock Po	rt Setting
										113200,	,11,0,1
	IP Modem	Configur	ation								
	Enable I	P Modem I	nterface	e Mo	dem is resp	onsive			S	now Mo	dem Log
	IP Modem	Network A	ddress:	192.168.2.	.7:777 c:20) @ 102	160.3.3					
	Modem mo	del detect	ad • Use	A:40:3A:E	0:20) @ 192	.108.2.3			Use <bi< th=""><th>er Name LANK></th><th></th></bi<>	er Name LANK>	
	SMS Service	e Center N	umber:	<optiona< th=""><th>1></th><th></th><th></th><th></th><th>Pas</th><th>sword</th><th></th></optiona<>	1>				Pas	sword	
	Max SMS L	ength: 160							<bi< td=""><td>LANK></td><td></td></bi<>	LANK>	
		-									
					(llose					

In the image above, note that the **Voice Modem** and **Cellular Modem Configuration** sections are disabled because there is no check mark in their **Enable** boxes; only the **IP Modem Configuration** section is enabled, but there is no limitation on how many modem types can be enabled concurrently.

Within the **IP Modem Configuration** group box, the user-configurable controls (with the exception of the **Enable** check box) are displayed in **blue font**; these are hyperlinks, clicking them opens the configuration window for each connection property. The connection properties are described below.

IP Modem Configuration						
🗹 Enable IP Modem Interface	Modem is responsive	Show Modem Log				
IP Modem Network Address: 192.168.2.7:777						
Network Adapter: MAC(50:9A:4C:5A:E6:2C) @ 192.168.2.3 User Name						
Modem model detected : UserDefin	<blank></blank>					
SMS Service Center Number: < OPTI						
Max SMS Length: 160						

The **IP Modem Network Address** specifies the network address to which ScadaPhone will send modem control commands. Note that the **IP Modem Network Address** setting contains the **TCP port number** as a suffix delimited by a colon (**192.168.2.7**:777). Clicking the blue label opens the following window:

■ IP Modem Configura IP Modem Ir Modem Ir	ation Iterface Modem is	responsive	Show Modem L	og
IP Modem Network Ad	dress: 192.168.2.7:777			
Network Adapter: MA Modem model detect	IP Modem Address	×	User Name <blank></blank>	
SMS Service Center N Max SMS Length: 160	Enter IPAddress:PortNumb format with port number s (example: 192.168.0.1:10	eer in dot-delimited separated by colon 24)	Password <blank></blank>	
	192.168.2.7:777	~		
	ОК	Cancel		

In most cases, the modem will be attached to the network through a router; it is strongly recommended that the modem be connected to a router port with a *static* IP Address. If the modem is connected to a router port which is assigned a *dynamic* IP Address, this setting in ScadaPhone will have to be adjusted each time the modem's IP Address changes.

Network Adapter

The next item in the **IP Modem Configuration** is only necessary if the ScadaPhone host computer has more than one **Network Interface Card** (NIC). If the computer only has one network adapter, it will be selected automatically; if there is more than one adapter, ScadaPhone needs to be configured to use the appropriate one. The list of installed adapters can be seen when the blue label is clicked:

IP Mode	m Configuration IP Modem Interfa	ce Modem is	responsive	{	Show Modem Log
IP Moden	n Network Address	: 192.168.2.7:777		-	
Network	Adapter: MAC(50):9A:4C:5A:E6:2C) @	192.168.2.3	Us	ser Name
Modem m	and a second of a				BLANK>
SMS Serv	Network Interface	Card Selector		X	ssword
Max SMS	IP Address	MAC Address	Description		LANK>
	127.0.0.1	00:00:00:00:00:00	Loopback Adapter		
	192.168.2.3	50:9A:4C:5A:E6:2C	Intel(R) Ethernet Connection (5) I219-	V	
	192.168.56.1	0A:00:27:00:00:0E	VirtualBox Host-Only Ethernet Adapter		
				_	
		ОК	Cancel		

SMS Service Center Number

In most cases, the **SMS Service Center Number** setting can be left blank. As the information window in the image below indicates, it is only necessary to modify this setting if there is some sort of cellularnetwork configuration problem which warrants overriding the service center number stored in the modem. If you are unsure about this setting, it is best to leave it unchanged (blank):

IP Modem Config	uration							
Enable IP Moden	n Interface Modem is responsive	Show Modem Log						
IP Modem Network Address: 192.168.2.7:777								
Network Adapter:	User Name							
Modem model dete	<blank></blank>							
SMS Service Center								
Max SMS Length:	Edit SMS Service Center Number	<						
	If your cellular modem has been correctly registered with your cellular carrier's network, the SMS Service Center Number should already be store in the device However, in some abnormal situations, it may become necessary to force the modem to use a specific Service Center Number as an alternative. If that is the case with your system, you will need to contact your carrier or do an internet search to find a suitable alternative number to enter in the space below. Search Tip: <yourcountry> <yourcarrier> "SMS Service Center Number" Enter the SMS Service Center Number for your carrier</yourcarrier></yourcountry>	d						

Max SMS Length

The default of **160 characters** is usually sufficient for this setting. ScadaPhone uses this measurement when constructing outgoing messages; ScadaPhone will combine multiple alarm messages into a single SMS text message if the total message length does not exceed this threshold. If your modem truncates messages at a shorter length, use this setting to avoid sending truncated messages.

☑ Enable IP Modem Interface Modem is responsive					
P Modem Network Address: 19	2.168.2.7:777				
letwork Adapter: MAC(50:9A:	4C:5A:E6:2C) @ 192.168.2.3	User Name			
Aodem model detected : UserD	efined	<blank></blank>			
MS Service Center Number: <0	OPTIONAL>	Password <blank></blank>			
Max SMS Length: 160					
Maximum SMS Message Length		×			
The standard maximum length adhere to this standard and tr not adhere to the 160 charac	n for SMS messages is 160 characters; howev uncate the outgoing messages at a shorter ter standard, the maximum message length Max Message Length = 160 characters <	ver, some modems do not length. If your modem does can be adjusted here:			

User Name / Password

Unlike their serial-connected counterparts, network-connected cellular modems have to guard against being controlled by unauthorized computers which may have access to the same network. To accomplish this, most IP Modems have the capacity to require a **User Name** and **Password** log-in sequence (usually supported via the **Telnet** protocol). If your modem requires a log-in, the **User Name** and **Password** must be specified here; if not, these fields can be left blank.

IP Modem Configuration ✓ Enable IP Modem Interface	odem is responsive	Show Modem Log
IP Modem Network Address: 192.168.2 Network Adapter: MAC(50:9A:4C:5A: Modem model detected : UserDefined	IP Modem User Name and Password X	User Name <blank></blank>
SMS Service Center Number: <option< b=""> Max SMS Length: 160</option<>	If the IP Network modem requires a User Name and Password, enter them here; otherwise, leave blanks.	Password <blank></blank>
	User 123 Password	
	0K Cancel	

The remainder of the controls in the **IP Modem Configuration** group box give feedback about the status of the modem connection. In the previous images, the green labels indicated that ScadaPhone had established a valid connection to a **UserDefined** modem type:

IP Modem Configuration					
Enable IP Modem Interface	Show Modem Log				
IP Modem Network Address: 192.168.2.7:777					
Network Adapter: MAC(50:9A:4C:5A:E6:2C) @ 192.168.2.3 User Name					
Modem model detected : UserDefin	<blank></blank>				
SMS Service Center Number: < OPTI					
Max SMS Length: 160					

If there is a problem with the modem connection, these labels will turn red and display error messages:

IP Modem Configuration		
Enable IP Modem Interface	Network socket not connected 00:00:25	Show Modem Log
IP Modem Network Address: 192.10	58.2.7:778	
Network Adapter: MAC(50:9A:4C:	5A:E6:2C) @ 192.168.2.3	User Name
Modem model detected : Unknown	l de la constante de	<blank> Password</blank>
SMS Service Center Number: < OPT	ONAL>	<blank></blank>
Max SMS Length: 160		

If there is a modem connectivity problem, ScadaPhone will also announce: *"I.P. modem network connection error"* over the local host-computer soundcard (when in **Run Mode**). If an **IP Modem Error Tag** has been configured into ScadaPhone's optional **Watchdog Features**, an alarm can be reported via some other reporting method (aside from the non-functioning IP Modem reporting method).

IP Modem Log

The **IP Modem Configuration** group box also has a **Show Modem Log** button. Clicking this button opens ScadaPhone's **IP Modem** window which contains a communications log which displays the command-and-response dialog between ScadaPhone and the IP Modem:

💋 IP Mo	odem			_	\times
Main Win	dow Dock	Modem Config	Reset Log Other Logs Command Timeouts Stats		
2018/09/	/14 13:25:2	0.081 [0.501]	ModemResponseState Changed From Unresponsive To Responsive		^
2018/09/	/14 13:25:2	1.836 [1.755]	AT+FMDL? <cr></cr>		
2018/09/	/14 13:25:2	1.953 [0.117]	AT+FMDL? <cr></cr>		
2018/09/	/14 13:25:2	1.955 [0.002]	OK <cr></cr>		
2018/09/	/14 13:25:2	4.200 [2.245]	AT+GMM <cr></cr>		
2018/09/	/14 13:25:2	4.327 [0.127]	AI+GMM <cr></cr>		
2018/09/	/14 13:25:2	4.330 [0.003]	Simulated GMM response <cr></cr>		
2018/09/	/14 13:25:2	4.331 [0.001]	Nodem Hodel Detected : UserDerined		
2010/05/	/14 13.25.2	5.301 [1.230] 5 705 [0 1241	ATT-CDS		
2010/09/	/14 13:25:2	5.705 [0.124] 5 709 [0.0021	OVECTS		
2018/09/	/14 13:25:2	7 952 [2 244]	AT+CMCL="ALL" <cd></cd>		
2018/09/	/14 13-25-2	8 076 [0 1241	AT+CMGL="ALL" <cd></cd>		
2018/09/	/14 13:25:2	8 079 [0 0031	OK <cr></cr>		
2018/09/	/14 13:25:3	30.334 [2.255]	ATI <cr></cr>		
2018/09/	/14 13:25:3	0.453 [0.119]	ATI <cr></cr>		
2018/09/	/14 13:25:3	0.455 [0.002]	OK <cr></cr>		
L					 ×
13:25:44	UserDefined	IP modem @ 192.1	58.2.7:777		

Note: that different types of logged events are color-coded for easier differentiation; the **ScadaPhone-to-Modem** command dialog is color coded blue (ScadaPhone) and purple (modem). In the example above, you can see that the blue ScadaPhone commands are followed by purple modem echoes and command responses.

This log (in conjunction with all of the other logs maintained in each ScadaPhone project) can be very valuable when troubleshooting unexpected system behavior. This log records all modem activity for the past 30 days. If there is a communications outage with the modem, it is instantaneously noticeable by viewing the colored log:

🚺 IP Modem — 🗆	Х
Main Window Dock Modem Config Reset Log Other Logs Command Timeouts Stats	
2018/09/14 11:49:27.558 [2.336] IPModem.TX('AT+GMM <cr>') FAILED; IPModemEnabled=True; SocketOK=False</cr>	^
2018/09/14 11:49:29.836 [2.278] SocketDisconnect	
2018/09/14 11:49:29.837 [0.001] IPModemClientSocketThread.OpenSocket: Windows socket error: A connection att	empt 1
2018/09/14 11:49:29.851 [0.014] IPModem.TX('ATI <cr>') FAILED; IPModemEnabled=True; SocketOK=False</cr>	
2018/09/14 11:49:32.837 [2.986] Client socket failed to open connection	
2018/09/14 11:49:32.854 [0.017] SocketLookup	
2018/09/14 11:49:32.855 [0.001] IPModem Client bound to Intel(R) Ethernet Connection (5) I219-V (50:9A:4C:5A	1:E6:20
2018/09/14 11:49:32.856 [0.001] SocketConnecting	
2018/09/14 11:49:37.116 [4.260] IPModem.Reset IPModemEnabled=True SocketActive=False	
2018/09/14 11:49:39.345 [2.229] IPModem.TX('AT+GMI <cr>') FAILED; IPModemEnabled=True; SocketOK=False</cr>	
2018/09/14 11:49:41.720 [2.375] IPModem.TX('AT+FMM? <cr>') FAILED; IPModemEnabled=True; SocketOK=False</cr>	
2018/09/14 11:49:44.093 [2.373] IPModem.TX('AT+FMDL? <cr>') FAILED; IPModemEnabled=True; SocketOK=False</cr>	
2018/09/14 11:49:46.346 [2.253] IPModem.TX('AT+GMM <cr>') FAILED; IPModemEnabled=True; SocketOK=False</cr>	
2018/09/14 11:49:48.721 [2.375] IPModem.TX('ATI <cr>') FAILED; IPModemEnabled=True; SocketOK=False</cr>	
2018/09/14 11:49:50.985 [2.264] IPModem.TX('AT+GMI <cr>') FAILED; IPModemEnabled=True; SocketOK=False</cr>	
2018/09/14 11:49:53.858 [2.873] SocketDisconnect	
2018/09/14 11:49:53.859 [0.001] IPModemClientSocketThread.OpenSocket: Windows socket error: A connection att	empt i
	~
11:49:56 Unknown IP modem @ 192.168.2.7:778	

Modem Configuration Data

ScadaPhone comes pre-configured with several known modem types, but it also extensible to accommodate new modem models as they become available. To accomplish this, ScadaPhone uses a data table which associates modem **Model Recognition Responses** with modem **Command Strings**.

To examine and modify this table, right-click the **Modem model detected** label on the **Modem Configuration** window:



Force Modem Model

In some cases, a modem hardware upgrade may involve replacing an obsolete modem with a newer model from the same manufacturer (for example, upgrading a **2G or 3G** modem with a **4G** modem). If this is the case, it is often true that the modem's command set will be *unchanged* from previous model's command set (only the radio frequencies are changed).

In this case, the user can simply instruct ScadaPhone to ignore the model-detection responses and force the modem interface to treat the modem as though it were a specific (known) model. This is called *"forcing the modem model."* This provides an easy way to test whether or not an existing command set is compatible with a new modem. Once it has been confirmed that the new model supports the old model's commands, the **Modem Configuration Strings** can be edited so that the normal configuration process can be used.

When the **Modem Mode Detected** label on the **Modem Configuration** window is *left*-clicked, the **Force IP Modem Model** window is displayed:

Force IP Modem Model	×					
At startup, ScadaPhone attempts to determine the type of IP network modem your system is connecting to. When an unknown type of modem is detected, ScadaPhone has no way of knowing which AT command set to use.						
In order to work around this problem, this window allows you to bypass the modem model detection logic and specify which command set to use.						
In order to find the correct command set, you will need to select various modem models from the list below and send a few test messages to verify that the selected command set is compatible with your modem.						
If the tests function correctly, the modem model that works.	you can leave the selection mark next to					
Force Modem Model						
O < Do Not Force >	O Digi TransPort WR31					
○ < User Defined >	○ < User Defined > ○ MultiTech MTR-LVW2					
O Digi TransPort WR11 O Sierra Wireless GX450						
ОК	Apply Cancel					

This window's first option, < **Do Not Force** > is the default selection; when this is selected, the **Force Modem Model** logic will be disabled and ScadaPhone will attempt to identify the modem model via the standard modem model query commands.

Note: that this window dynamically adjusts to include all models defined in the **Modem Configuration Strings**.

IP Modem Watchdog:

ScadaPhone supports an optional "Watchdog" signal to report any malfunction of the IP Modem interface. The IP Modem interface can go into an error state for a variety of reasons:

- The modem can fail.
- The network router may be down.
- The modem's LAN connection can be unplugged or moved to a different IP Address.
- The modem may lose radio connection with the cellular carrier.

ScadaPhone will make local audio announcements to alert the system operator of IP Modem connectivity issues; however, if there is no operator near the system console to hear the audio alerts, it is advisable to use ScadaPhone's **IP Modem Error Tag** to drive an alarm which can be reported via some alternate (i.e. non-IP-Modem) reporting method.

The IP Modem Error Tag must be specified in ScadaPhone's Watchdog Features window:

🖸 ScadaPhone — 🗆 🗙						- 🗆 X
File	Vode	Options Window Logs	Modem(s)	Web Server ScadaLink T	TP Schedu	uler Session Help
C:\ScadaTEC Alarm Ack		Alarm Ack Options	🜠 Watchdog Features 🛛 🕹			
Logs Alaı		Alarm Announcement	Alarm Announcement			that around entry layers of reliability if abactmal extern conditions should arise
<u>F</u> loat <u>N</u> ew		Alarm Logic Scan Rate	Alarm Logic Scan Rate		g reatures	that provide extra layers of reliability if abnormal system conditions should arise.
Type Tag		Amplitude Adjustment	ude Adjustment			te system operators even in the computer of primary reporting device has faulted.
OLE	Clus	Audio Devices	Main Thread Watchdog (mandatory) E			xplanation Modem Error Restart (optional) Explanation
OLE	Clus	Email Settings				In the event the IP modem should fail to respond to ScadaPhone's
OLE	Clus	Incoming Calls	CheckPointTracker Watchdog (optional) E			
CMF	Clus	Minimize On Startup	Use Check Point Tracker	nal) E	rigger a scott and be tained on the scott of statis into the modern via a "reset cable" controlled by the PLC.	
CMF	Clus	Pager String	Coffware License Alarm (antion			
CMF	Clus	Remote Access Softwar	Report exprision of software license			To use this optional safeguard, specify the name of the discrete tag you wish ScadaPhone to use as a modern failure signal. Whenever the modern is operating normally, this bit will be set to logical zero (FALSE); if the modern fails to respond to ScadaPhone's AT commands, ScadaPhone will write a logical one (TRUE) to this bit. The Modern Error Bit will be returned to zero as soon as a valid response is received from the modern.
CMP Clu		Show System Info	(This includes removal of USB Key)			
CMF	Clus	Shutdown Tag	Alarm Group: N/A			
OLE	Clus	Text To Speech				
OLE	Clus	Watchdog Features				
E Filt	er List	Wrap Main Window Tak	Heartheat	Tag (optional)	Evoluoiti	logic that is associated with this bit; for example the logic should wait for the Modem
11:08:16 Develo		lopment Mode	Browse	Not Utilized>	Explanau	Error Bit to be TRUE for 30 seconds or more before taking action. Otherwise, brief
			Collular M	odem Error Tag (optional)	Evolopati	modern communication problems may produce annoying raise alarms.
			Browse	<not utilized=""></not>	Explanaci	ОК
			Fron Tag (optional)	Evolution		
		Browse	TP. MODEM FATLURE	Explanaci		
			Voice Mor	lem Error Tag (ontional)	Evolanati	
			Browse	e <not utilized=""></not>		
			No Dial Te	ne Tag (optional) Explanation		
			Browse	<not utilized=""></not>	Explanaci	
			Check for No Dial Tone during idle periods			
			Check Dial Tone when in Standby Mode			
			OK Cancel			

This tag can be defined as either a ScadaPhone Holding Tag, ScadaLink Tag or TTP Tag; if it is defined as a ScadaLink Tag, it's value can be communicated to the SCADA server to drive other (non-ScadaPhone) reporting methods such as a PLC-connected hardware dialer or on-screen SCADA operator alert message.

(775)348-7471, International | (888) 722-3283, USA & Canada www.scadatec.com | support@scadatec.com