# **INSTRUCTION MANUA**



# RAVEN X-HSPA Sierra Wireless Cellular Modem

June 2014



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# **1** General Description

This manual provides information for interfacing the Sierra Wireless Raven X cellular modem to Campbell Scientific dataloggers. Please note that this manual we will focus on the use of the RAVEN X-HSPA on the Bell, Telus and Rogers networks.

The Sierra Wireless AirLink Raven X Cellular Modem is a high-speed interface optimized for use on 3G architecture. The modem is accessed through the Internet using TCP/IP communications protocol using a Dynamic or Static IP address.

The Raven X offers two-way data exchange with a base station PC via the High-Speed Uplink Packet Access (HSUPA) network, with fallback to HSDPA, UMTS, EDGE, GPRS, or GSM. The Raven X modem is for use on the Bell, Telus, or Rogers networks.

The AirLink Embedded Operating System (ALEOS) is the embedded core technology of the Sierra Wireless AirLink products simplifies installation, operation and maintenance of any solution, and provides an always-on, alwaysaware intelligent connection for mission-critical applications.

# 2 Establish Cellular Service

# 2.1 Raven X Cellular Coverage/Service Requirements

What you need:

Determine coverage at the datalogger site for your chosen service provider. Coverage maps are available on each provider's website. It is also possible to search for "Canadian cellular tower maps" for information on tower locations and possible coverage.

A public Dynamic IP or Static IP account established with Service Provider on their HSPA network. The IP and account types will vary depending on the Service Provider.

**NOTE** It is recommended to discuss the account types available and their requirements with your intended Service Provider before purchasing the RAVEN X-HSPA modem.

What you receive from the Service Provider:

- SIM card
- 10-digit Mobile Identification Number (MIN or MDN)
- Access Point Name (APN) (i.e. corp.bell.ca, staticipwest.telus.com or VPN.COM for Rogers)
- Network Password for use with User ID in modem configuration
- IP address (for a Static IP account only)

Recommended Dealers:

- 1. Telus Communications Group, Red Deer, AB (403) 347-0777
- 2. Bell ThinkTel Communications, Edmonton, AB 1(800) 928-4465)

# **3** Specifications

# 3.1 Modem Specifications

Technology:	HSUPA
With Fallback To:	HSDPA, UMTS, EDGE, GPRS, GSM
Band:	TriBand for UMTS/HSDPA/HSUPA • 850/1900/2100 MHz Dual Band for HSUPA • N.A.: 850/1900 MHz Quad Band GSM/GPRS • 850/900/1800/1900 MHz
HSUPA Throughput: Ethernet: RS-232 Data Rates:	2 Mbps uplink, 7.2Mbps downlink 10/100 Mbps RJ-45 300 bps to 230.4 kbps
Input Voltage: Current Drain at 12 Vdc:	9 to 28 VDC 160 mA idle (idle for 10 to 20 sec), 180/200 mA transmit/receive
Operating Temperature: Storage Termperature: Operating Humidity:	-30° to +70°C -40° to +85C 5% to 95% non-condensing
Application Interfaces:	TCP/IP, UDP/IP, DHCP, HTTP, SNMP, SMTP, SMS, MSCI, Binary, Modbus
Serial Interface: Ethernet Interface: RF Antenna Connectors:	RS-232, DB9-F 10/100 Mbps RJ-45 50 Ohm SMA
Status LED's:	Network, Signal, Activity, Service, Power
Dimensions: Weight:	143mm x 37mm x 75mm 317 grams

# 4 Configuration

# 4.1 Base Station Requirements for Raven X-HSPA

A PC running Campbell Scientifics' LoggerNet or PC400 software, with access to the Internet.

# 4.2 Datalogger Site Equipment

- Raven modem with power cable (included with modem).
- Antenna The antenna chosen for use in your application must be connected to the "Antenna" connector of the RAVEN X modem. Do not connect the antenna to the Rx Diversity connector.
- Datalogger CR1000, CR3000, CR800 series, CR200 series, CR510, CR10(X), CR23X, CR5000.
- SC105 or SC932A Interface connects the modem to the CR510, CR10(X) or other dataloggers' CS I/O port.
- The SC105 must be configured for use with the modem using the Device Configuration Utility. Settings should be:

CS I/O Mode: SDC Address 7 RS-232 Mode: Modem Baud Rate: 115.2K or 9600 baud depending on datalogger model 8 data bits, 1 stop bit, no parity

- L18663 Null Modem Cable connects the modem to the CR1000, CR3000, CR800 series, CR200 series, CR23X, or CR5000 RS-232 port.
- L13658 Ethernet Cable connect the modem Ethernet port to a PC or other Ethernet device. The Raven X Ethernet port is auto-sensing so a cross-over cable can also be used.
- C2675 RAVEN Mount Kit Used to mount the modem in the datalogger enclosure with the use of DIN rail and DIN rail adaptors.
- **NOTE** If you have a black SC12 cable that is not Rev 1 or newer (as indicated on cable), it is a CS I/O cable only and will not work for RS-232. Connect the black SC12 cable between the datalogger and the SC932A. Use a 9-pin serial cable or a blue ribbon cable between the phone and the SC932A.



# 4.2.1 Datalogger Wiring Examples

L18663 null modern cable connects the modern to the CR1000, CR3000, CR800 & CR200 series, CR23X or CR5000 RS-232 port



SC105 interface connects the modem to a datalogger's CS I/O port; recommended for dataloggers with the Pakbus Operating System.

# Wiring:

Red	12V (or
	switched 12V)

Black G

White Not Used



SC932A interface connects the modem to the CS I/O port; recommended for dataloggers with the Mixed-Array Operating System.

- C2675 Raven Mounting Kit includes mounting hardware for securing the modem to below referenced environmental enclosure. Raven X should be mounted in a position that allows easy access for the cables so they are not bent, constricted
- Antenna the following antennas are available from Campbell Scientific. The antenna must be connected to the "Antenna" connector of the RAVEN X modem. Contact a Campbell Scientific Applications Technician for help in determining the best antenna for your application.
  - The **C2446** is a dual-band, omnidirectional antenna for our CDMA and GPRS digital-cellular modems. This antenna is recommended for locations where cellular coverage is strong. The C2446 includes a mount/u-bolt assembly that allows the antenna to be mounted to a mast, crossarm, or user-supplied pole (outer diameter of up to 1.5" (3.8 cm)).
  - The **C2445** 9dBd Yagi Antenna is a higher gain antenna that should be "aimed" at the service provider's antenna. The C2445 is a 800 MHz antenna and bracket/u-bolt assembly for attaching the antenna to a mast or post. The antenna comes with 10' of cable. This antenna is recommended for fringe areas that require a higher gain antenna.
  - The C2444 9dBd Yagi Antenna is a higher gain antenna that should be "aimed" at the service provider's antenna. The C2444 is a 800 MHz antenna and bracket/u-bolt assembly for attaching the antenna to a mast or post. The antenna comes with 30' of cable and surge protection. This antenna is recommended for fringe areas that require a higher gain antenna.
  - The L18285 1 dBd omnidirectional antenna. This antenna is dual band, covering both the 800 MHz and 1.9 GHz bands, and is strongly recommended where cellular coverage is strong. The L18285 includes a mount/u-bolt assembly for attaching the antenna to a mast, post, or crossarm up to 1.5" (3.8 cm) in diameter.
  - The L21831 Half-Wave Dipole Whip Antenna is a lower gain antenna used in transmitting short distances. It is an 800 MHz cellular antenna that terminates in a SMA Male connector for attachment to the modem. This antenna is intended for use inside the enclosure. Please note that the backplate of the enclosure is a grounded plane. If it is interposed between the antenna and the cell tower, it may attenuate the strength of the transmission signal. Simply turning the enclosure 90 to 180 degrees on its mounting mast may solve weak transmission issues.



L18285 1 dBd Omni Directional Antenna



C2445 9dBd Directional Yagi Antenna



L21831 Half-Wave Dipole Whip Antenna

FIGURE 4.2-2. Antennas for Use with the Raven Modems

- Power Supply (see power considerations).
- Environmental Enclosure— ENC 10/12, ENC 12/14, or ENC 16/18.

# 4.3 Power Considerations

A power cable included with the modem connects to the datalogger's 12 V or switched 12 V terminal. Connection to the switched 12 V terminal allows the datalogger to switch power to the modem during scheduled transmission intervals if desired. Connect the red lead wire to 12 V, and the black lead to G (ground). The white wire lead has no function and can be ignored.

# 5 Program the Modem

The Sierra Wireless AceManager software is used to program the modem:



It is recommended that the modem be provisioned and tested in the office (assuming cellular coverage) rather than in the field.

The recommended way to configure a Raven X modem is to connect the modem directly to your computer using the Serial port. The AceManager utility is available from Sierra Wireless's website (<u>www.sierrawireless.com/support</u>).

AceManager is used to configure settings in the modem and load Campbell Scientific's Raven X-HSPA template file. Campbell Scientific's "Raven X-HSPA Bell Template 115200", "Raven X-HSPA Telus Template 115200" or "Raven X-HSPA Rogers Template 115200" files are for dataloggers that support 115200 baud (e.g. CR1000). The template files configure the modem to be compatible with CSI dataloggers and the respective networks. Template files are available from Campbell Scientific's Website: <u>www.campbellsci.ca/download</u>.

# 5.1 Indicator Lights

When your Raven X is connected to power and an antenna, there is a specific pattern to the lights to indicate its operation mode.



• **Network** – Indicates a successful connection to the cellular network with an IP address given and a channel acquired.

- **Signal** Light shows the strength of the signal and may be nearly solid (strong signal) or flashing (weaker signal). A slow flash indicates a very weak signal.
- Activity Lights will flash as data is transferred to and from the modem on the network.
- **Service** Indicates when the connection is HSUPA/HSDPA or UMTS. Unlit indicates EDGE or GPRS.
- **Power** Indicates the power adapter is connected and there is power getting to the Raven X.
- The **Reset button** (on the left side of the Raven X) has two functions. If it is quickly depressed and released, the modem will simply power cycle the internal hardware. If, however, the reset is depressed and held for several seconds (count 10 slowly, and wait for the power light to go off after the light pattern stops), the ALEOS configuration settings will return to the factory defaults.

### **Light Patterns**

The LEDs on the front of the modem will respond in different patterns to indicate modem states.

- Normal Each LED, mentioned above, lit as applicable.
- Start up The LEDs will cycle from left to right.
- **PassThru mode** Network and Signal LEDs will blink in tandem. The Activity LED will blink when transmitting or receiving data.
- **SOS** The Network LED blinks.
- **Configuration Reset** The LEDs will cycle left to right and then right to left 4 times.
- Authentication Failure The Network, Signal, and Activity LEDs blink every 2 seconds.
- **Data Retry** The Network, Signal, and Activity LEDs blink every 3 seconds.
- Invalid MAC Address or Ethernet Initiation Fail The Service LED will blink.

# 5.2 Using AceManager to Configure the Modem

In order to provision the RAVEN X-HSPA modem on the required network and to have it function with the datalogger the modem must be configured using the AceManager utility. The AceManager utility is available from Sierra Wireless (http://www.sierrawireless.com/Support/Downloads.aspx).

As part of the configuration process you must enter the account specific information supplied by your Service Provider. This includes the following:

### Bell:

Static IP

- 1. Phone Number The modems 10-digit phone number
- 2. The regional Network APN (i.e. corp.bell.ca)
- 3. Network User ID (i.e. 10-digit phone number @corp.bell.ca)
- 4. Network Password (account/modem specific)

### Dynamic IP

- 1. Phone Number The modems 10-digit phone number
- 2. Network User ID (i.e. 10-digit phone number @public.bell.ca)
- 3. Modem Name A unique name for the modem (i.e. the modems 10digit phone number)
- 4. Network APN public.bell.ca

# Telus:

Static IP

- 1. Phone Number The modems 10-digit phone number
- 2. The Public Static IP
- 3. The regional Network APN (i.e. staticipwest.telus.com)
- 4. Network User ID (i.e. 10-digit phone number @staticipwest.telus.com)
- 5. Network Password (account/modem specific)
- 6. The Define PDP context

### Dynamic IP

- 1. Phone Number The modems 10-digit phone number
- 2. Network User ID (i.e. 10-digit phone number @connect.telus.com)
- Modem Name A unique name for the modem (i.e. the modems 10digit phone number)
- 4. The Define PDP context
- 5. Network APN public.telus.ca

### Rogers:

Dynamic IP

- 1. Phone Number The modems 10-digit phone number
- Modem Name A unique name for the modem (i.e. The modems 10digit phone number)

Template files for Static and Dynamic IP configurations are available from Campbell Scientific's Website at: <u>www.campbellsci.com/downloads</u>.

Connect the Raven X-HSPA to a com port on the PC with a direct RS-232 serial cable. Also connect the antenna, and 12V power.

166	.155.179.1	61 - Sierra	Wireless Ac	eManag	er							
File Mo	dem Templat	e Tools Hel	p									
D); Connect	t Refresh	🕼 Refresh All	<b>X</b> Disconnect	<b>/</b> Write	Reset	🚔 Load	<b>L</b> Save	🖹 🖹 Сору	X Clear	Ч <mark>Ж</mark> Update PRL	Auto Refresh:	Disabled 💌
												^
												~

Run AceManager to get the following screen:

Click the **Connect** icon in the Configuration Panel to open the connection options dialogue box. Select PPP, and the COM port the modem is connected to. Do not change the Password (the default password is 12345). Click OK to continue.

If the modem has been configured for "PPP" (see Appendix A), then you may have to check the "Use SOS Mode" box.

Connect t	o Modem				
UDP TCP SMS	Port: Password:	СОМ1	~	🔲 Use SOS Mode	
Ethernet	]	OK	Cancel		

Click the **Load** icon in the Configuration Panel. When prompted for a template file name, select the appropriate .xml file (downloaded from the CSC website). Enter the required configuration information for the Service Provider.

### **Bell Static IP Example:**

Select the "Misc." tab from the list on the left hand side. Enter the Phone Number, Network User ID, and Network Password.

COM1 - Sierra W le Modem Template	′ireless AceManager ⊨ Tools <u>H</u> elp			
Donnect Refresh	Refresh All Disconnect	Write Reset	Copy Clear Update PRL	Auto Refresh: Disabled 🗸
emplate "C:\Document	s and Settings\JAN.CAMPBE	LL\Desktop\Product Development	Documents\Communications\Rav	en Cell Project 2011\RAVEN X & XT Templa
GROUPS	MODEM DATA			PRINTABLE VIEW
INFO	AT	Name	Value	New Value
STATUS	*DATE	Date and Time	07/29/2011 14:27:24	
COMMON Misc	OPRG	Enable Over-the-Air Programing	1	
Serial TCP	*NETPHONE	Phone Number	0123456789	
UDP		Force Static IP	0.0.0.0	
Dynamic IP PPP/Ethernet	*DPORT	Device Port	6785	
PassThru SMTP	*NETUID	Network User ID	0123456789@corp.bell.	
Other Firewall	*NETPW	Network Password	01234567	
Port Forwarding  LOGGING	*NETALLOWZEROIP	Allow Last Byte of net IP = Zero	1	
REPORT	*HOSTPAP	Request PAP	0	
Server 1	S53	Destination Address		
TELEMETRY	S53	Destination Port	0	
ADDR LIST	S53	Default Dial Code	Т	·
CELLULAR		Enable Event Reporting	0	
IPSEC		Enable AceWeb	1	<b>_</b>
GRE				
WIFI				
???				,

Select the "Cellular" tab from the list on the left hand side. Enter the modem APN. The APN is provided by your network provider when setting up your account.

Modern Templa	ate roois <u>H</u> eip			
ha 🔹 🕀 nect Refresh f	Refresh All Disconn	ect Write Reset Load Save Copy Clear	Update PRL	Auto Refresh: Disab
GROUPS	MODEM DATA			PRINTABLE VIEV
INFO	АТ	Name	Value	New Value
STATUS	*NETAPN	Set APN	corp.bell.ca	corp.bell.ca
COMMON	*RXDIVERSITY	RX Diversity	0	0-Disable
Misc	+CGDCONT	Define PDP context	1,IP,corp.bell.ca	(1,IP,corp.bell.ca
Telnet	+COPS	Set Carrier [operator] Selection	0	0
UDP	+CGQREQ	Set Quality of Service Profile		
DNS	+CGQMIN	Minimum Acceptable Quality of Service Profile		
Dynamic IP			6	

### **Bell Dynamic IP Example:**

Select the "Misc." tab from the list on the left hand side. Enter the Phone Number, and Network User ID.

Modem Templa	ite Tools <u>H</u> elp				
ect Refresh F	Refresh All Disconnect	Virite Reset	a 🗙 🍇 ny Clear Update PRL	Auto Refresh: Disabl	
successful					
GROUPS	MODEM DATA			PRINTABLE VIEW	
INFO	AT	Name	Value	New Value	
STATUS	*DATE	Date and Time	06/04/2014 17:17:55		
COMMON	OPRG	Enable Over-the-Air Programing	1	1-ON .	
Misc	*NETPHONE	Phone Number	7805551234		
Serial Telnet		Force Static IP	0.0.0.0		
TCP	*DPORT	Device Port	6785	6785	
DNS Dynamic IP	*NETUID	Network User ID	7805551234@public.bell.	ca	
PPP/Ethernet PassThru	*NETPW	Network Password			
SMTP Other	*NETALLOWZEROIP	Allow Last Byte of net IP = Zero	1	1	
Firewall - IP Firewall - Ports	*HOSTPAP	Request PAP	0	0-NO -	
Port Forwarding	S53	Destination Address	ſ		
REPORT Server 1	S53	Destination Port	0	0	
	052	Default Dial Code	Т	T-TCP +	

Select the "Dynamic IP" tab from the list on the left hand side. Enter the Modem Name.

💋 COM1 - Sierra Wirele	ss AceManager				
File Modem Templa	te Tools <u>H</u> elp				
Connect Refresh	Refresh All Disconnec	t Write Reset Load Save	Copy Clear Upda	ate PRL	Auto Refresh: Disabled -
Write successful					
GROUPS	MODEM DATA				PRINTABLE VIEW
INFO	AT	Name	Value	New Value	and the second se
STATUS	*MODEMNAME	Modem Name	7805551234	$\mathbf{C}$	
	*DOMAIN	Domain	eairlink.com		
COMMON Misc Serial	*IPMANAGER1	IP Manager Server 1 (IP Adrs)	eairlink.com	1	
Telnet	*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0		
	*IPMGRKEY1	IPMServer1 Key	******	ī .	
Dynamic IP	*IPMANAGER2	IP Manager Server 2 (IP Adrs)	edns2.eairlink.con		
PPP/Ethernet PassThru SMTD	*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0		
Other Firewall - IP	*IPMGRKEY2	IPMServer2 Key	*******	I	

### **Telus Static IP Example:**

Select the "Misc." tab from the list on the left hand side. Enter the Phone Number, Force Static IP, Network User ID, and Network Password.

COM1 - Si Modem	<mark>erra</mark> W Template	/ireless AceMa	nager											_	Ľ
∎ç nnect F	(d) Refresh	Refresh All Di	Sconnect	<b>V</b> rite	<b>!</b> Reset	🚅 Load	Save	Сору	$\mathop{\times}\limits_{\operatorname{Clear}}$	내고 Update PRL			Auto Refresh	: Disab	lei
nplate "C:\D	ocument	s and Settings\JA	N.CAMPBE	LL\Desk	top\Proc	duct Dev	elopmer	nt Docur	nents\Co	mmunications	Raven (	Cell Project 2	011\RAVEN	X&XTT	en
GRC	OUPS	MODEM DATA											PRINTABLI	E VIEW	
I	NFO	AT		Name	•				Valu	e		New Val	ue		
STA	TUS	*DATE		Date	and Ti	me			07/2 18:4	9/2011 5:59					
СОМІ	MON <u>Misc</u>	OPRG		Enable Over-the-Air Programing				1			1-0N		•		
-	TCP	*NETPHONE	E	Phone Number			0123456789			「			١		
Dynam	DNS DIC IP			Force	Static	IP			192.	192.168.13.31					ł
PPP/Ethe Pas	ernet	*DPORT		Devic	e Port				6785	i		$\triangleright$	$\leq$	$\leq$	
	SMTP Other	*NETUID		Network User ID						1				١	
Fir ort Forwa	ewall rding	*NETPW		Netw	ork Pa	ssword	ł				7				ł
LOGG	SING	*NETALLOV	VZEROIP	Allow Zero	Last E	Byte of	net IF	) =	1			1			
REP	ORT	*HOSTPAP		Requ	est PA	P			0			0-NO		-	
TELEME	TRY	S53		Desti	nation	Addre	ss								
ADDR	LIST	S53		Desti	nation	Port			0			0			
CELLU	JLAR	S53		Defau	ult Dial	Code			T			T-TCP		-	
TF	SEC			Enab	le Ever	nt Repo	orting		0					-	
				Enab	le Ace\	Neb			1			1-Host 0	Only	-	

Select the "CELLULAR" tab and enter the APN under "Set APN". Under the "Define PDP context" enter a New Value that includes the APN provided by Telus for your region. In the example below it is "1,IP, staticipwest.telus.com", but this may vary and should read "1,IP, *APN Provided*". Ensure that the "Set Carrier [operator] Selection" reads as "1,2,302880".

5	сом1 - 9	Sierra W	'ireless AceMan	ager								×
File	Modem	Template	Tools <u>H</u> elp									
( Cor	nnect	🕼 Refresh	Refresh All Disc	onnect Write Reset	🗳 📕 Load Save	Сору Сору	× Clear	Update PRL		Auto Refresh:	Disabled 🗸	•
Ten	nplate "C:\\	Document	s and Settings\JAN	CAMPBELL\Desktop\Pr	oduct Developme	nt Docun	nents\Co	ommunications\Ra	ven Cell Projec	t 2011\RAVEN )	X & XT Templat	te
	GR	OUPS	MODEM DATA							PRINTABLE	VIEW	<u>^</u>
		INFO	AT	Name		Valu	e		New V	alue		
	ST	ATUS	*NETAPN	Set APN	Set APN			staticipwest.telus.com				
	COM	IMON	*RXDIVERSIT	Y RX Diversity		1	1 0-Disable				-	
		Misc Serial	+CGDCONT	Define PDP cont	ext	1,IP,staticipwest.telus.com						
	TCP UDP DNS		Set Carrier [ope Selection	rator]	1,2,302880					$\sim$		
	Dynamic IP PPP/Ethernet +CGQREQ			Set Quality of S	ervice Profile							
	Pa	SMTP Other	+CGQMIN	Minimum Accept of Service Profile	able Quality							
	F	irewall										

# Telus Dynamic IP Example:

Select the "Misc." tab from the list on the left hand side. Enter the Phone Number, and Network User ID.

💋 COM1 - Sierra Wirele	ess AceManager					
File Modem Templa	ite Tools <u>H</u> elp					
Connect Refresh F	Refresh All Disconnect	Write Reset Load Save	Copy Clear Update PRL ue" column to the modern	Auto Refresh: Disabled 💌		
Write successful						
GROUPS	MODEM DATA			PRINTABLE VIEW		
INFO	АТ	Name	Value	New Value		
STATUS	*DATE	Date and Time	06/04/2014 17:10:51			
COMMON	OPRG	Enable Over-the-Air Programing	1	1-ON -		
<u>Misc</u> Serial	*NETPHONE	Phone Number	7805551234			
Telnet TCP		Force Static IP	0.0.0			
UDP DNS	*DPORT	Device Port	6785	6785		
Dynamic IP PPP/Ethernet	*NETUID	Network User ID	7805551234@connect.telus.com	.ct.telus.com		
PassThru SMTP	*NETPW	Network Password	J			
Other Firewall - IP	*NETALLOWZEROIP	Allow Last Byte of net IP = Zero	1	1		
Port Forwarding	*HOSTPAP	Request PAP	0	0-NO 🔹		
REPORT	\$53	Destination Address				
Server 1	S53	Destination Port	0	0		
TELEMETRY	\$53	Default Dial Code	T	T-TCP		
ADDR LIST		AceWeb Port	9191			

Select the "Dynamic IP" tab from the list on the left hand side. Enter the Modem Name.

🖉 COM1 - Sierra Wirele	ss AceManager			
File Modem Templa	te Tools <u>H</u> elp			
Connect Refresh F	lefresh All Disconnect	t Write Reset Load Save	Copy Clear Update PRL	Auto Refresh: Disabled
Nrite successful				
GROUPS	MODEM DATA			PRINTABLE VIEW
INFO	AT	Name	Value New Va	lue
STATUS	*MODEMNAME	Modem Name	7805551234	
COMMON	*DOMAIN	Domain	eairlink.com	
Misc	*IPMANAGER 1	IP Manager Server 1 (IP Adrs)	eairlink.com	
Telnet	*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0	
UDP	*IPMGRKEY1	IPMServer1 Key		
Dynamic IP	*IPMANAGER2	IP Manager Server 2 (IP Adrs)	edns2.eairlink.com	
PPP/Ethernet PassThru	*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0	
SMTP Other	*IPMGRKEY2	IPMServer2 Key	******	

### **Rogers Dynamic IP Example:**

Select the "Misc." tab from the list on the left hand side. Enter the Phone Number.

06			× 40		ALC: TRANSPORT
onnect Refresh	Refresh All Disconnect	Write Reset Load Save Copy	Clear Update PRL	Auto Refre	sh: Disable
mplate "C:\Document	s and Settings\JAN.CAMPBE	LL\Desktop\Product Development Docu	ments\Communications\	Raven Cell Project 2011\RAVE	N X & XT Tem
GROUPS	MODEM DATA			PRINTAB	LE VIEW
INFO	AT	Name	Value	New Value	
STATUS	*DATE	Date and Time	06/05/2012 16:30:28		
	OPRG	Enable Over-the-Air Programing	1	1-ON	•
TCP	*NETPHONE	Phone Number		ſ	
DNS DNS		Force Static IP	0.0.0.0		
PPP/Ethernet	*DPORT	Device Port	6785		
SMTP	*NETUID	Network User ID		1	
Firewall Port Forwarding	*NETPW	Network Password			
LOGGING	*NETALLOWZEROIP	Allow Last Byte of net IP = Zero	1	1	
REPORT Server 1	*HOSTPAP	Request PAP	0	0-NO	-
TELEMETRY	S53	Destination Address		Г.	_
ADDR LIST	S53	Destination Port	0	0	
CELLULAR	S53	Default Dial Code	T	T-TCP	-
IDELC		Enable Event Reporting	0	0-Turn Off ER	-

Select the "Dynamic IP" tab from the list on the left hand side. Enter the Modem Name.

COM1 - Sierra W	/ireless AceManager			
e Modem Templati	e Tools <u>H</u> elp			
Donnect Refresh	Refresh All Disconner	t Write Reset Load Save Co	a X Va py Clear Update PRL	Auto Refresh: Disabled
mplate "C:\Documen	ts and Settings\JAN.CAM	PBELL\Desktop\Product Development Do	cuments\Communications\	Raven Cell Project 2011\RAVEN X & XT Temp
GROUPS	MODEM DATA			PRINTABLE VIEW
INFO	AT	Name	Value	New Value
STATUS	*MODEMNAME	Modem Name	5879204921	
COMMON	*DOMAIN	Domain	earlink.com	
Misc Serial	*IPMANAGER1	IP Manager Server 1 (IP Adrs)	eairlink.com	
TCP	*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0	0
DNS Dynamic IP	*IPMGRKEY1	IPMServer1 Key	******	
PPP/Ethernet PassThru	*IPMANAGER2	IP Manager Server 2 (IP Adrs)	edns2.eairlink.com	
SMTP Other	*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0	0
Firewall Port Forwarding	*IPMGRKEY2	IPMServer2 Key	******	

### All Examples:

Once the necessary fields have been entered, click the "Write" button to commit the changes to the modems memory. At this point the modem is fully programmed to communicate to a Campbell Scientific datalogger using a wireless IP connection.

Turn off the power to the modem and disconnect from the PC. Turn the power back on and the modem will register itself on the network within 2 minutes. To confirm this, make

sure that the Network and Service light is solid. If the Network light is flashing the modem has not registered. If the Service light is not lit but the Network light is, the modem has registered on the network, however, there is no HSUPA/HSDPA or UMTS coverage and the modem has registered on the EDGE or GPRS network. If the Modem's Network light is not solid after this time contact Campbell Scientific Canada at 780-454-2505 for support.

# 6 Setup LoggerNet

- 1. Select Add Root | IP Port
- 2. Add a Datalogger to the IP Port
- 3. On the IP Port page:
  - a. Select Communications Enabled.
  - b. In the Internet IP Address field, enter the IP address of the modem followed by .eairlink.com and the Device port ID. This number is :6785 and is found in the "Common" tab settings of the Raven modem (see below).
    - c. Extra response time should be 10 12 seconds.

d. Click "Apply".	
-------------------	--

📽 Setup				
Eile Edit Tools Options Help				
Kan Add <u>R</u> oot Add <u>D</u> elete Rename	Undo Redo			
PakBusPort	IPPort : IPPort			
CH 1000	Hardware			
	Standard			
	Communications Enabled			
	Internet IP Address			
	Advanced	Cache IP Address		
	TCP Listen Onlu			
	Extra Response Time	10 s	÷	
	Delay Hangup	00 s 000 ms	×	
	IP Port Used for Call-Back	0		
	AirLink Device ID	T		
			U.	
Check Applu Cancel	No problems found wit	h settings for the selected	device	
			021.0103990423	

- 4. Click on the CR1000 and change the Maximum Packet size from the default 1000 to 400 bytes. Please also make sure that the proper Pakbus address is in the Pakbus address field.
- 5. Click "Apply".

🗳 Setup				_ 🗆 🛛				
<u>File Edit Tools Options H</u> elp								
Add Root Add Delete Rename	Marca Cal Undo Redo							
B     BPort     Crite     Crit	CR1000 : CR1000	í						
CRI000	Hardware Schedule Data Files Clock Program							
	Standard Communications Enable Call-Back Enabled PakBus Address Advanced	led 1						
	Maximum Packet Size	400						
	Security Code	0						
	Delay Hangup 00 s 000 ms							
	Enable Automatic Hole	Collection						
Check Apply Cancel	No final storage tables are def Scheduled Data Collection is o	ined in the stations program disabled		<b>A</b>				

# 7 Connections to the Datalogger

- 1. If connecting to a CR1000, CR800 or CR23X and you would like to connect to the RS232 port you will require a null modem cable, Campbell Scientific part number L18663.
- 2. Connect one end of the Null Modem Cable to the Raven X modem and the other to the datalogger's RS232 port.
- 3. If connecting to any datalogger's CS I/O port you will require an SC932A interface from Campbell Scientific. Connect the supplied black SC12 cable to the datalogger side of the SC932A interface and then to the CS I/O port of the datalogger.

Connect the DCE Device side of the SC932A interface to the Raven X modems RS232 port using the supplied straight through serial cable L10873.



4. In some cases it may be desirable to connect using the Ethernet interface available on the Raven X. To do this you will require a CR1000 or CR3000

with either a NL120 Ethernet Interface, NL115 Ethernet/Compact Flash Module or any datalogger using the NL200. A crossover Ethernet cable is needed to connect the two devices.

Please review the literature for the specific interface for more details.

# 8 Troubleshooting

If LoggerNet/PC400W software is unable to establish a connection with the modem:

- 1. Check your account information (you may have to call your provider for this or look at your agreement).
  - a. Verify there is coverage at your location.
  - b. Check the Network light. Network indicates a successful connection to the cellular network with an IP Address given and a channel acquired.
  - c. Make sure the modem has sufficient power.
  - d. Check the signal strength using AceManager (make sure your antenna is properly connected and oriented). Signal strength should be in the 51 to -90 range (-51 is a strong signal, -90 is a weak signal).
  - e. If you have a Static IP account, verify the Static IP Address. Preceding zeros in the IP address are not entered in LoggerNet.
  - f. If you have a Dynamic IP account, you will need to have a DDNS (dynamic domain name server) name that LoggerNet can reference to make the connection.
  - g. Connect with the modem through the serial port using AceManager. If the modem has been configured for "PPP" (see Appendix A), then you may have to check the "Use SOS Mode" box.

h. From the "Status" group, make sure the "Network State" is "Network Ready", and note the "Network IP" address. This is the current IP address for the modem (a dynamic IP address will change each time the modem is reset). Try connecting to this IP address using LoggerNet. If LoggerNet connects with the IP address, but not with the modem name.domain name, then there may be a problem with the Dynamic IP setup in the modem.

Modem Templat	e Tools Help	anager					
nnect Refresh	Refresh All	Disconnect Write Reset	🗃 📕 Load Save	🗈 🗙 Copy Clear	Update PRL	Auto Refresh:	Disabled
GROUPS	MODEM DAT	A				PRINTABLE	VIEW
INFO	AT	Name		Value			^
STATUS	*NETIP	Network IP		70.192.46.1	181		_
<u>31A103</u>	*NETSTATE	Network State		Network Dor	_		
COMMON	*NETCHAN	Channel		630		-	
USB	*NETRSSI	RSSI (dBm)		-72			-
Serial TCP		Host Mode		PPP			
UDP DNS		Host Signl Level		DCD: HIGH HIGH	DTR: HIGH DSR: HIGH	CTS: HIGH RTS:	-
PPP/Ethernet	*NETERR	Network Error Rate		255	-		
PassThru		Network Bytes Sent		262			
Other		Network Bytes Rovd		348			-
Friends		Host Serial Bytes Sent		368			-
LOGGING		Host Serial Bytes Rovd		660			-
1X/EV-DO		Network IP Packets Se	nt	4			-
		Network IP Packets Rc	vd	4			-
TELEPIETKT							_

Select the "Serial" Group, and make sure the "AT Verbose Mode" is set to "Numeric" for use with the CR10(X), CR510, and CR23X dataloggers, or "Verbose" for other dataloggers (e.g. CR1000).

🖳 🗸 👔		◎ / ! 🖙 🖬	⊫ ×	1	Auto Befresh: Disabled
onnect Refresh	Refresh All	Disconnect Write Reset Load Save	Copy Clear	Update PRL	Auto Honesit.
emplate "C:\AirLink\ra	avengprs_11520	0.xml" loaded			
GROUPS	MODEM DAT	ΓA .			PRINTABLE VIEW
INFO	AT	Name	Value	New Value	
STATUS	S23	Configure Serial Port	115200,8N1	115200,8N1	
COMMON	١Q	Serial Port Flow Control	0	0-None	
Misc	S50	Data Forwarding Timeout	1	1	
Serial	S51	Data Forwarding Character	0	0	
TCP	E	DB9 Serial Echo	0		•
DNS	E	USB Serial Echo	1	· · · · · · · · · · · · · · · · · · ·	
PPP/Ethernet	E	Telnet Echo	1	, 	
PassThru SMTP	J-	AT Verbose Mode	1	1-Verbose	
Other			_		
Friends	8D	DIR Mode		U-Ignore DTR	
LOGGING	S211	DTR Mode	1	1-Ignore DTR	
TELEMETRY	&S	Assert DSR	1	1-In Data Mode	
ADDR LIST	&C	Assert DCD	1	1-In Data Mode	•
	*CTSE	Enable CTS to Indicate Network Coverage	ge O	0-Disabled	•
EUGL/HSDPA	Q	Quiet Mode	0	0-OFF	
	x	Call Progress Result Mode	0	0-OFF	
	*NUMTOIP	Convert 12 digit Number to IP	0	0-Use as Name	•

If the modem answers but you do not get a connection to the datalogger:

- 1. Check your connection to the datalogger.
  - a. An SC932A or SC105 interface is required to connect the modem to a datalogger's CSI/O port. The default settings for SC105 (OS > 4) can be used with the Raven X when the modem is configured for 115200 baud (baud rate is set by the template file).

Baud rate of the SC105 must match the baud rate in the modem (which has to be supported by the datalogger). SC105 settings for use with the Raven X are listed below, which are configured using the DevConfig utility.

SC105 settings for the Raven X:

CS I/O Mode: SDC Address 7 RS-232 Mode: Modem Baud Rate: 115.2K or 9600 baud depending on datalogger model 8 data bits, 1 stop bit, no parity

b. Make sure the modem is connected to the "DCE Device" connector on the SC932A, or the "Modem" connector on the SC105.

A null modem cable is required to connect the modem to a datalogger's RS-232 port. No other interface is required.

- 2. Check your LoggerNet setup.
  - a. Make sure the port number at the end of the IP address matches the port number of the Raven (e.g. 6785, see Figure 8-1).

★ Setup Screen				
Eile View Network Tools Options He	lp			
Add Root Add Delete Rename				EZ View
Network Map By IPPort Algorithms CR1000	IPPort : IPPort Hardware Notes			
	Communications Enabled			
	Internet IP Address 435555	51212.eairlink.com:6785		
	Advanced	ache IP Address		
🗲 COM1 SOS - Sierra Wireless Ace	Manager			
File Modem Template Tools Help				
Connect Refresh Refresh All Disc	onnect Write Reset Load Save	Copy Clear Update PR.	Auto Refresh:	Disabled 🗸
Template "C:\AirLink\ravengprs_115200.xm	"loaded			
GROUPS MODEM DATA			PRINTABLE	ЛЕШ
INFO AT	Name	Value	New Value	
STATUS *DATE	Date and Time	10/21/2008 10:17:11		
COMMON	Enable Over-the-Air Programing	1	-ON 💌	
Misc *NETPHONE	Phone Number	14357571662		
Serial	Force Static IP	0.0.0.0		
UDP *DPORT	Device Port	12345	6785	
DNS Dynamic IP *NETUID	Network User ID	ispda@cingulargprs.com		
PPP/Ethernet PassThru *NETPW	Network Password	CINGULAR1		
Other *NETALLOWZER	OIP Allow Last Byte of net IP = Zero	1	1	
Friends *HOSTPAP	Request PAP	0	0-NO	

FIGURE 8-1. Device Port Configuration

b. Try adding a few seconds to the extra response time on the IP Port in LoggerNet (you should not need more than 5 seconds).

- c. If you are trying to communicate to a PakBus datalogger:
  - i. Verify the PakBus address in the setup screen matches that of the datalogger.
  - ii. If you have multiple PakBus networks/ports setup in LoggerNet, uncheck the 'PakBus Port Always Open' options on all PakBus ports.
- 3. Use AceManager to check modem communications with datalogger.

The modem's "Host Serial Bytes Sent" and "Host Serial Bytes Received" windows can indicate whether or not the modem is communicating with the datalogger.

Establish a connection with the modem through the cellular network using AceManager (click on the Modem menu item, Connect, UDP. Enter the IP address, and click OK). Go to the Status group and note the "Host Serial Bytes Sent" and "Host Serial Bytes Received" values (Figure 8-2). Try connecting with the datalogger using LoggerNet/PC400W. If a connection cannot be established, close LoggerNet and reconnect with AceManager and compare the current values with the previous values.

If the values are the same, the modem is not attempting to make a connection with the datalogger. Check that the .xml template file has been loaded (Section 5.3).

If the "Host Serial Bytes Sent" increased, the modem attempted to connect to the datalogger, but the response from the datalogger did not make it back to the modem. Check the interface between the modem and the datalogger (Section 4.2).

If both values incremented, the modem and the datalogger are communicating. Try adding some extra response time in LoggerNet.

**NOTE** Baud rate changes require the modem to be reset before the change takes effect. Click the Reset icon in AceManager to the reset the modem and implement the change.

🖋 COM1 S	60S - Sier	ra Wireless	AceManag	er										
File Moder	n Templati	e Tools Helj	2											
Donnect	🕼 Refresh	😨 Refresh All	Oisconnect	/ Write	Reset	😅 Load	<b>L</b> Save	Copy	X Clear	Update PRL	Auto R	efresh:	Disat	iled 🔽
Template "C	:\AirLink\ra	vengprs_1152	00.xml" loadec											
G	ROUPS	MODEM DA	ГА								PRINT	TABLE V	VIEW	^
	INFO	АТ	Name			v	alue						^	
5	TATUS	*NETIP	Networ	< IP		1	66.213	.213.1	76					
		*NETSTAT	Networ	< State		N	letwork	Ready						
0	MMON Misc	*NETCHAN	Channe	Channel			142							
	USB	*NETRSSI	RSSI (	lBm)		-	83							
	TCP	*NETOP	Curren	t Netwo	rk Opera	tor C	Cingula	r, 3104	10					
	UDP DNS	+ICCID	SIM ID			8	90141	042112	496991	.77				=
Dyn.	amic IP	+CIMI	IMSI			3	10410	124969	917					
PPP/E P	assThru		Host M	ode		P	PP							
	SMTP Other		Host Si	gnl Lev	el		CD: H	IGH DT	R: HIGH	DSR: HIGH CTS:	HIGH RTS: HIGH			
	Friends	*NETERR	Networ	c Error I	Rate	0	)							
LO	GGING		Networ	< Bytes	Sent	0	)							
TELE	METRY		Networ	< Bytes	Rcvd		)							
			Host S	erial Byt	tes Sent	3	90							
ADD	K LIST		Host S	erial Byt	tes Rovd	6	60							
EDGE/H	ISDPA		Networ	< IP Pa	ckets Se	nt 0	)						~	. 🗸

FIGURE 8-2. AceManager status page showing communications with modem.

# Appendix A. PPP Configuration for the Raven X

The Raven X's template file configures the Raven X to function as a serial server. As a serial server, the modem has an IP address, and port number 3001 for the Raven X's RS232 port.

LoggerNet sends data via TCP/IP over the internet to the datalogger. The modem removes the data from the TCP packet and sends the data out the RS232 port to the datalogger. Returning data is put into a TCP packet by the modem and sent back to LoggerNet.

Settings in the Raven X and datalogger (CR800, CR1000, and CR3000), can be changed to configure the RS232 serial ports for Point-to-Point (PPP) protocol. When configured as PPP, the Raven X functions as a router, routing TCP/IP communications to the IP stack of the datalogger. PPP enables the datalogger to send/receive messages via email, HTTP, FTP to and from the datalogger, and allows concurrent communications between networked dataloggers and LoggerNet.

The default datalogger port number for PakBus/TCP communications is 6785. The datalogger will also respond to port 80 for HTTP, 23 for Telnet, and 21 for FTP. These ports can be disabled in the dataloggers configuration.

**NOTE** After the RS232 port on the modem has been configured as PPP, use AceManager with a TCP or UDP connection to establish communications with the modem. It may also be possible to connect with the modem through its RS232 port using the "SOS" mode.

Raven X Settings for PPP Mode:

Download the current Raven X AceManager template file from <u>http://www.campbellsci.ca/downloads</u> Load the template into AceManager and make the following changes 2 before writing them to the Raven X modem.

Use AceManager to configure the following UDP setting:

• MD = 02-PPP

Use AceManager to configure the following Misc. setting:

• \*DPORT (Device Port) = 3001

💅 COM1 - Si	erra W	ireless Acel	Manager										
File Modem 1	Template	e Tools Help	)										
Dy Connect R	😰 Refresh	🕼 Refresh All	Oisconnect	/ Write	<b>!</b> Reset	🚔 Load	<b>L</b> Save	Copy	$\mathbf{X}$ Clear	୍ଷ୍ମ Update PRL	Auto Refre	esh: Disal	oled 🔽
Modem disconn	iected												
GRO	DUPS 1	MODEM DAT	ΓA								PRINTAE	SLE VIEW	
I	NFO	AT	Name				Value	New \	/alue				
	THE	MD	Startup Mo	de Defa	ault DB9	Serial	00	02-P	PP	•			
		S82	UDP Auto	Answer			0	0-Disable					
COMM	Misc	S83	UDP Idle T	imeout			0	0					
s	USB Serial	HOR	UDP Auto	Answer	Response	e	0	0-No Response					
	TCP	*UDPLAST	UDP Conne	ect Last	:		0	0-Do	not ch	ange S53 💌			
	DNS	AIP	Allow Any 1	P			0	0-All	ow only	S53 💌			Ξ
PPP/Ethe	ernet	*UALL	Allow All UI	DP			0	0-No	effect	•			
Pass	SMTP	*DU	Dial UDP A	lways			0	0-Dis	able	•			
O	Other iends	*USD	UDP Serial	Delay			0	0					
	TNIC	,	·										
1X/EV	-DO												
TELEME	TRY												
ADDR L	LIST												, 🗸

Datalogger Settings:

Using the Device Configuation Utility, configure the following setting on the TCP/IP tab:

- Config Port Used = RS232
- IP Address = 0.0.0.0
- Modem Dial String = PPP
- Modem Dial Response = CONNECT
- User Name and Password are blank

Device Configuration	Utility Beta 1.8	
File Language Help		
Device Type	Deployment	
CD295 CH200 CCM220 COM220 CCM220 CCM220 CR10X CR10X+PB CR10X+PB CR10X+PB CR20X Series CR23X+PB CR23X+	Datalogger       Ports Settings       TCP/IP       Net Services       Advanced         DNS Server 1:       0.0.0.0       PPP       Config/Port Used:       RS232       IP         DNS Server 2:       0.0.0.0       IP       Address:       0.0.0.0       IP         TCP/IP Info:       IP       Address:       0.0.0.0       IP       IP         Modem Dial String:       PPP       Modem Dial Response:       CONNECT       IP	
Serial Port COM1 Baud Rate 115200 Disconnect	PPP Dial         Specifies the dial string that would follow ATD (e.g., #777 for Redwing CDMA) or a list of AT commands seperated by `,' (e.g., ATV1;AT+CGATT=0;ATD*99***1#) that will be used to initialise and dial through a modern before a PPP connection is attempted. A blank string means that dialing is not necessary before a PPP connection is established.         Apply       Cancel       Factory Defaults       Read File       Summary	<

Using the Device Configuation Utility, select the "Net Services" tab. The "Pakbus/TCP Service Port" default is 6785. This is the "Port" number that will follow the "IP address" for Loggernet to communicate with the datalogger.

🗇 Device Configuration	Utility Beta 1.8
File Language Help	
Device Type	Deployment
CD295	Datalogger Ports Settings TCP/IP Net Services Advanced
COM220	HTTP Enabled PakBus/TCP Server PakBus/TCP Port
CR10X CR10X-PB	FTP Enabled 6785
CR10X-TD CR200 Series	FTP User Name: anonymous 6785
CR23X E CR23X-PB	FTP Password: * 6785
CR23X-TD CR3000	Teinet Enabled
CR5000	Ping (ICMP) Enabled
CR510-PB	PakBus/TCP Service Port: 6785
CR510-TD CR800 Series	
CR9000X CS150	
MD485	
NE100	
Serial Port	
COMI	Port Baud Rate Settings
Com	This setting governs the baud rate that the datalogger will use for a given port in order to 🛛 💻
Baud Rate	support PakBus or PPP communications. For some ports (COM1 through COM4), this setting also controls whether the nort will be enabled for PakBus or PPP communications.
115200 🗸	
Disconnect	Apply Cancel Factory Defaults Read File Summary

Using the Device Configuration Utility, fix the RS232 Baud Rate to "115200 Fixed" from the "Port Settings" tab.

e Language Help	
evice Type	Deployment
ED295	Datalogger Ports Settings TCP/IP Net Services Advanced
COM220	Select the Port RS-232
R10X R10X-PB	Baud Rate: 115.2K Fixed V Begin End
R200 Series	Beacon Interval: 0
R23X-PB	Verify Interval:
R23X-1D R3000	
R5000	The selected port has been configured for PPP services and cannot be used for PakBus
IR510-PB	
IR510-TD IR800 Series	
R9000X	
-5150 4D485	
VL100	Add Range Remove Range
- viel Devie	
snai Puri.	Port Baud Rate Settings
:OM1 💌	This setting governs the baud rate that the datalogger will use for a given port in order to
aud Date	support PakBus or PPP communications. For some ports (COM1 through COM4), this
ada Nate	setting also controls whether the port will be enabled for PakBus or PPP communications.
.15200 💙	

Loggernet Settings:

Enter the IP address of the Raven X, and the PakBus/TCP Service Port number of the datalogger (e.g. 6785 as explained above).

🖋 Setup				
File Edit Tools Options Help				
Add Root Add Delete Rename	Lindo Redo			
	IPPort : IPPort			
	Hardware			
	Standard			1
	Communications Enabled			
	Internet IP Address	4357608027.eairlink.com:6785		
	Advanced Call-Back Enabled TCP Listen Only	Cache IP Address		
	Extra Response Time	04 s		
	Delay Hangup	00 s 000 ms	-	
	IP Port Used for Call-Back	0		
	AirLink Device ID			
Check Apply Cancel	No problems found wit	h settings for the selecte	d device	2
		Connect	ed: localhost	

# Appendix B. EmailSend Using the Gmail Outgoing SMTP Server

The datalogger has a mail client in it similar to a mail client on a computer. For the datalogger to send an email, it needs an SMTP server to send through like any other mail client. The Telus Wireless SMTP server can be used for sending outgoing email from the datalogger. Contact your service provider for more information.

**NOTE** In order for the datalogger to send email, a PPP connection between the datalogger and modem is required. Please refer to Appendix A for details on this configuration.

# **B.1 Setting up a Gmail Account**

First you need to create a Gmail account if you do not already have one. To create an account, go to <u>www.gmail.com</u>. Gmail accounts are free of charge.

The credentials to access the mail server will be the user name and password used when creating the Gmail account.

In the following example program you will see:

- ServerAddr set to smtp.gmail.com
- UserName set to (the gmail account user name)
- Password (the one you established at Gmail)

# **B.2 Sending to Multiple Addresses**

Sending to multiple email address can be done by using a comma to separate the email addresses (<u>dataloggers@campbellsci.ca</u>, <u>customer@emailaddress.com</u>).

# **B.3 Sending a Text Message to a Phone**

The datalogger can only send email messages. To send a text message to a phone the email needs to be converted to a text message via an email to text message gateway. Most cellular providers have an email to text message service for their phone subscribers.

Telus's max text message size is 132 characters, any email messages greater than 132 characters will be sent as a second message. Contact your service provider for information about their email to text message gateway server address.

EmailSend Program Example

The following example sends an email message when an alarm condition is True. Both the CR1000 and Raven modem must be configured as PPP as described above.

```
'Main program variables
Public Batt, RefTemp, Temp
Public Socket AS Long
'declare Email parameter strings (as constants), Message String & Result Variable
Const ServerAddr="smtp.gmail.com"
Const UserName="gmail account name"
Const Password="datalogger"
Const ToAddr="dataloggers@campbellsci.ca, customer@emailaddress.com"
Const FromAddr="gmailaccount@gmail.com"
Const Subject="Email Message Test"
Const Attach=""
Const CRLF = CHR(13) + CHR(10)
Public Result as String * 100
Public AlarmTrigger As Boolean
Public Message As String * 250
Public EmailSuccess As Boolean
DataTable (TenSecData, True, -1)
  DataInterval (0,10,Sec,10)
  Sample (1,Batt,FP2)
  Sample (1,Temp,FP2)
EndTable
BeginProg
 Scan (1,Sec,3,0)
    Battery (Batt)
    PanelTemp (RefTemp,250)
    TCDiff (Temp,1,mV2_5C,1,TypeT,RefTemp,True,0,250,1.0,0)
    CallTable TenSecData
  NextScan
SlowSequence
  Scan(1, sec, 1, 0)
    If AlarmTrigger = False Then
      If Temp > 27 Then AlarmTrigger = True
      If AlarmTrigger Then
       Message = "Warning!" + CRLF + CRLF
        Message = Message + "An alarm condition has been identified. '
        Message = Message + "The temperature is " + Temp + " degrees C." + CRLF + CRLF
        Message = Message + "Datalogger time is " + Status. Timestamp
    EmailSuccess=EmailSend (ServerAddr,ToAddr,FromAddr,Subject,Message,Attach,UserName,Password,Result)
      EndIf
    EndIf
  If Temp < 27 Then AlarmTrigger=False
  NextScan
EndProg
```



