882-GPRS-GEN, 882-EDGE-GEN, 882-HSPA-XXX
GSM Cellular Data Modem & IP Router

User Manual
001-0003-832
Revision 5; September 2011

CalAmp reserves the right to modify the equipment, its specification or this manual without prior notice, in the interest of improving performance, reliability, or servicing. At the time of publication all data is correct for the operation of the equipment at the voltage and/or temperature referred to. Performance data indicates typical values related to the particular product.

No part of this documentation or information supplied may be divulged to any third party without the express written consent of CalAmp. Products offered may contain software which is proprietary to CalAmp. The offer or supply of these products and services does not include or infer any transfer of ownership.

Modem Use
The 882 GSM Series modems are designed and intended for use in fixed and mobile applications. "Fixed" assumes the device is physically secured at one location and not easily moved to another location. Please keep the cellular antenna of the 882 GSM Series modem at a safe distance from your head and body while the modem is in use (see below).

Important
Maintain a distance of at least 20 cm (8 inches) between the transmitter's antenna and any person while in use. This modem is designed for use in applications that observe the 20 cm separation distance.

Interference Issues
Avoid possible radio frequency (RF) interference by following these guidelines:

- The use of cellular telephones or devices in aircraft is illegal. Use in aircraft may endanger operation and disrupt the cellular network. Failure to observe this restriction may result in suspension or denial of cellular services to the offender, legal action or both.
- Do not operate in the vicinity of gasoline or diesel-fuel pumps unless use has been approved and authorized.
- Do not operate in locations where medical equipment that the device could interfere with may be in use.
- Do not operate in fuel depots, chemical plants, or blasting areas unless use has been approved and authorized.
- Use care if operating in the vicinity of protected personal medical devices, i.e., hearing aids and pacemakers.
- Operation in the presence of other electronic equipment may cause interference if equipment is incorrectly protected. Follow recommendations for installation from equipment manufacturers.

UL Installation Instructions

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D OR non-hazardous locations only.
- **WARNING – EXPLOSION HAZARD –** Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.
- **WARNING – EXPLOSION HAZARD -** Substitution of components may impair suitability for Class I, Division 2.
- Antenna to be connected to the RF and/or AUX ports must be provided by the manufacturer.
- "The unit is to be powered with a Listed Class 2 or LPS power supply", rated 9-28Vdc, 625mA min or rated 12Vdc, 1.5A or equivalent.
- Device must be installed in an end use enclosure.
- All wiring routed outside the enclosure, except for the antenna, must be installed in grounded conduit, following acceptable wiring methods based on installation location and electrical code.

The USB connector is for temporary connection only during maintenance and setup of the device. Do not use, connect, or disconnect unless area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion.

- Do not operate reset switch unless area is known to be non-hazardous.

See Table 7 for full UL Ratings on each product.

Mobile Application Safety

- Do not change parameters or perform other maintenance of the 882 GSM Series modem while driving.
- Road safety is crucial. Observe National Regulations for cellular telephones and devices in vehicles.
- Avoid potential interference with vehicle electronics by correctly installing the 882 GSM Series modem. CalAmp recommends installation by a professional.

Revision History

2008 Feb	Released
2008 July	Rev 2 - updates include Firewall functionality, new screen formats.
2009 Sept	Rev 3 - updates include Black case with new power supply connector, Internal/External Serial ports, new screen format configuration file save & upload, and other functionality revisions. Removed 882-HSDP unit references
2010 Oct	Rev 4 - updates include new screen formats to reflect Firmware Rev 3.05. Updated to include UL Certification, Instructions and Ratings
2011 Sept	Rev5 - Updated UL ratings, product images throughout.

TABLE OF CONTENTS

1 PRODUCT OVERVIEW

The 882 GSM Series Cellular Data Modem & IP Router from CalAmp is the ideal solution for a wide range of cellular data network serial and Ethernet connectivity requirements. The 882 GSM Series modems all support packet data services.

- The 882-GPRS supports GPRS data.
- The 882-EDGE supports GSM, GPRS and EDGE data.
- The 882-HSPA supports HSUPA, HSDPA, EDGE and GPRS data.

The 882-HSPA will automatically be backward compatible to the level of service available from the carrier.

1.1 MODULE IDENTIFICATION

The label contains the product part number, serial number, FCC ID and the International Mobile Equipment Identity (IMEI) numbers. The IMEI number, shown in decimal format, is used by the GSM network to identify valid devices. The IMEI is used only to identify the device, and has no permanent or semi-permanent relation to the subscriber.

1.2 CATALOG PART NUMBERS

882-GPRS-GEN
882-EDGE-GEN
882-HSPA-GEN, 882-HSPA-ATT

1.3 FEATURES AND BENEFITS

- GPRS Dynamic or Static IP – Carrier Dependent
- Tri-Band UMTS/HSUPA (850/1900/2100) and Quad-Band GSM/GPRS network support
- Data rates up to 7.2 Mbps downlink and 2.0 Mbps uplink for HSPA
- Inbound and Outbound Ethernet Routing
- Embedded Linux on ARM 9 processor
- Internet access and web browsing via Ethernet connector
- VPN support
- DHCP Server and Inbound port mapping/translation (Port Forwarding)
- Modem Domain Names with Dynamic DNS
- Inbound IP termination with Static IP
- TCP/IP Packet assembler and dis-assembler for serial connected devices
- Local or remote configuration using HTML web server
- On-board SIM socket (1.8/3V)
- Diversity antenna port/auxiliary port for increased receive sensitivity
- Firewall configuration for increased network security
- USB Host Controller

1.4 EXTERNAL CONNECTIONS

Figure 1 shows the external connections for the 882 device. Front panel connections are described in Table 1. Rear panel connections are described in Table 2.

Figure 1 882 External Connections

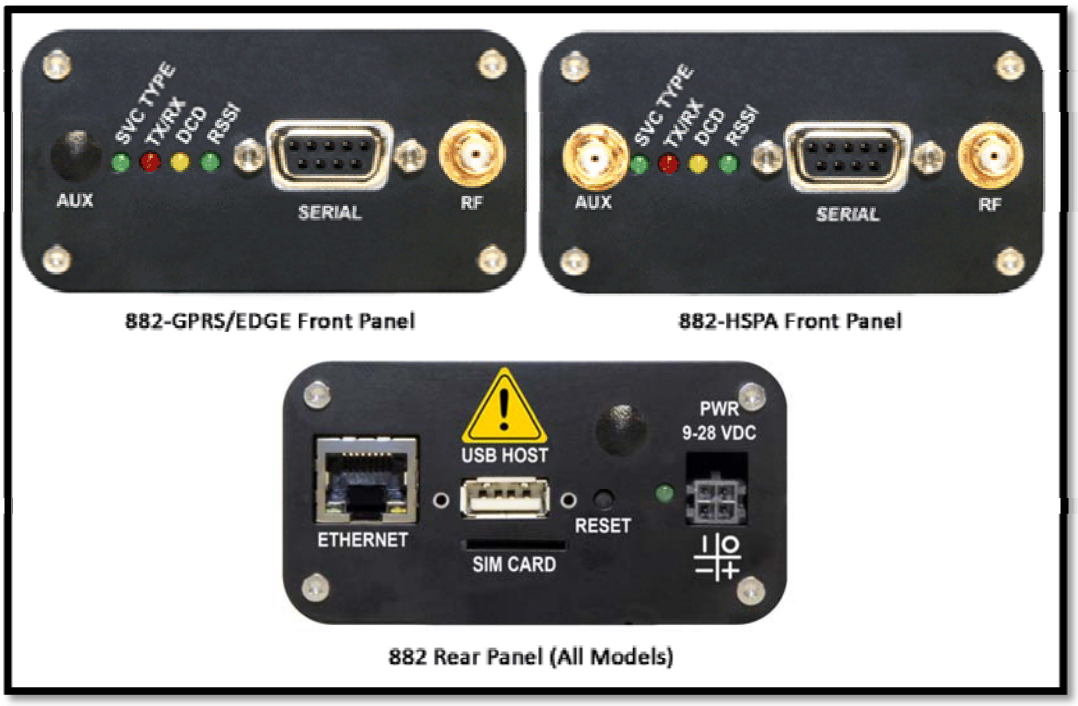


Table 1 – Front Panel Connections

Panel Indicator	Connection	Description
SVC TYPE	Service Type	Solid = Higher speed service Blinking = Lower speed service Off = No service
TX/RX	Transmit/Receive	Indication of data transmission or reception activity
DCD	Data Carrier Detect	Indicates modem's connection on the cellular network
RSSI	Receive Signal Strength Indicator	Solid = strong Blinking = medium Off = poor or none
Serial	RS-232	Serial to IP conversion use
RF (SMA)	Antenna	Main RF antenna input
AUX (SMA)	Diversity or GPS Antenna	Connector for Diversity or Cellular/GPS combination antenna (882-HSPA only)

Table 2 – Rear Panel Connections

Panel Indicator	Connection	Description
ETHERNET	RJ-45 Ethernet	Interface for Ethernet connection to devices
USB HOST	USB	Interface for external devices (i.e., memory drives or GPS devices). ODP use only.
RESET		Hold for one second to reset unit. If held for at least 4 sec, unit will reconfigure to factory default settings.

Panel Indicator	Connection	Description
PWR LED		Power indicator
PWR Jack	Molex 43025-0400 Power – bottom pins I/O – top pins	Interface for power plug (9-28VDC) Interface for Input and Output control lines; ODP use only.
SIM CARD	SIM Card socket	Interface for SIM card. Your wireless service provider will supply the SIM card with your wireless service contract.

1.5 RS-232 SERIAL PORT INTEGRATION PARAMETERS

Table 3 provides the serial cable design information to integrate the 882 GSM Series modem into your system. Table 4 gives the default RS-232 communication parameters.

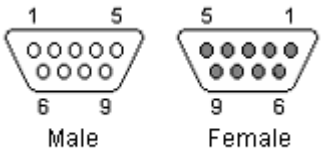
Table 3 – Standard RS-232 DE-9 Pin out

Pin	Name	Direction	Description
1	CD	←	Carrier Detect
2	RX	←	Receive Da a
3	TX	→	Transmit Data
4	DTR	→	Data Terminal Ready
5	GND		System Ground
6	DSR	←	Data Set Ready
7	RTS	→	Request to Send
8	CTS	←	Clear to Send
9	RI	←	Ring Indicator
Note: Direction is DTE relative DCE			

Table 4 – Default RS-232 Communication Parameters

Bits Per Second	115,200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

Figure 2 DE-9 Connectors



1.5.1 ODP (OPEN DEVELOPERS PLATFORM) OVER RS-232

The LandCell-882 includes the Open Developers Platform (ODP), which permits customers to develop their own Linux based applications which run on the modem's ARM9 (AT91RM9200) processor. The customer's application can utilize the external RS-232 port, and or an internal 3 pin (GND, RXD, TXD) RS-232 port and is able to transfer data over the cellular WAN using the linux socket libraries. The LandCell firmware also supports an API that allows the customer's application to access diagnostic data from the cell module such as connection status and RSSI. More information and support is provided by CalAmp's Applications Engineering organization.

1.6 PRIMARY ANTENNA

The primary antenna connection on the 882 GSM Series modems are female connectors, therefore you must purchase an antenna with an SMA male connector. Do not select an SMA antenna with "reverse polarity" or RP-Male. When using a direct mount or "rubber duck" antenna, choose the antenna specific to your band requirements. Mounting options and

cable lengths are user's choice and application specific. The AUX antenna connector is installed standard on the 882-HSPA modem and can be used for Diversity or True GPS.

The diversity port on the device supports three bands, Cellular (850MHZ), PCS(1900MHZ), and GPS(1575MHZ). Connect a dual band cellular antenna to this port to implement RX diversity on the unit and increase receive sensitivity on the cellular network. Connect a GPS antenna, with an average gain >-5dBi, if using the GPS functionality. If both RX diversity and GPS are required, install a Cellular/GPS combo antenna.

1.7 ACCESSORIES & OPTIONS

Available accessories and their descriptions are shown in Table 5.

Table 5 – 882 Available Accessories

Accessory/Option	Order Number	Description
	ACC-ANTN-RBD	4” Rubber Duck Antenna
	ACC-ANTN-MAG	3” Mag Mount Antenna
	ACC-PWSP-ML2	110 VAC Input Power
	ACC-PWDC-MLX	DC Power Cable
	ACC-CABL-SER	DB-9 Serial Cable
	ACC-CABL-ETH	7’ Ethernet cable

2 GETTING STARTED

The 882 GSM Series modems can be configured via HTML web pages or AT commands on the serial port. You will need a GSM Cellular account and a carrier provided SIM card. For TCP/IP please request a GSM account with Mobile IP and optionally Static IP or Simple IP (SIP). This is carrier dependent.

The modem is configured with default settings and is ready to be configured via HTML. You may need to activate the modem with your carrier to start using it. The default settings are programmed for most operations.

2.1 PACKAGE CONTENTS

- 882 Cellular Data Modem
- Power Cable
- Information Card

2.2 INSERTING THE SIM CARD

Before powering up the modem, you should insert the SIM card with the gold side up as shown in Figure 3. Push the card completely into the slot until it clicks in place.

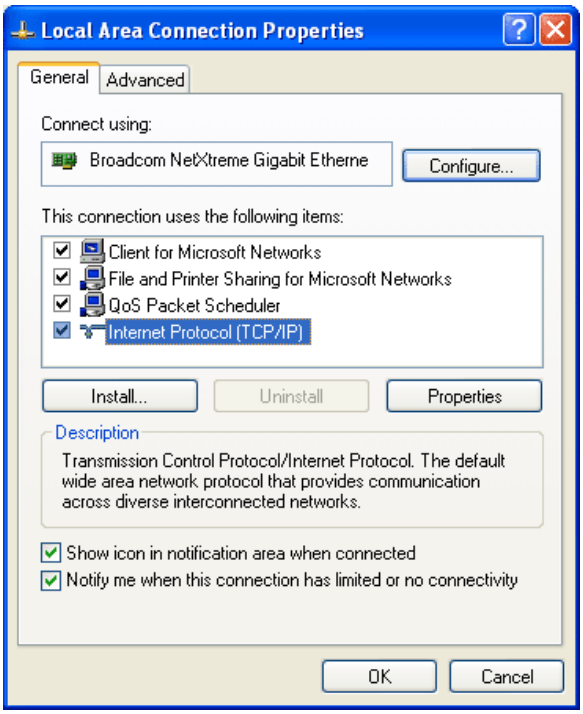
Figure 3 SIM Insertion

Connect an antenna to the RF connector on the front panel of the 882 modem. Connect the Ethernet cross-over cable into the modem's Ethernet Port and plug the other end into the network port of your PC. Connect the Power Adapter to the modem and plug into a proper AC power socket. The Power LED on the panel should activate. The Service LED (SVC TYPE) and RSSI LED will light green to indicate the modem has finished starting up and is functioning.

2.3 LOCAL PC ETHERNET CONFIGURATION

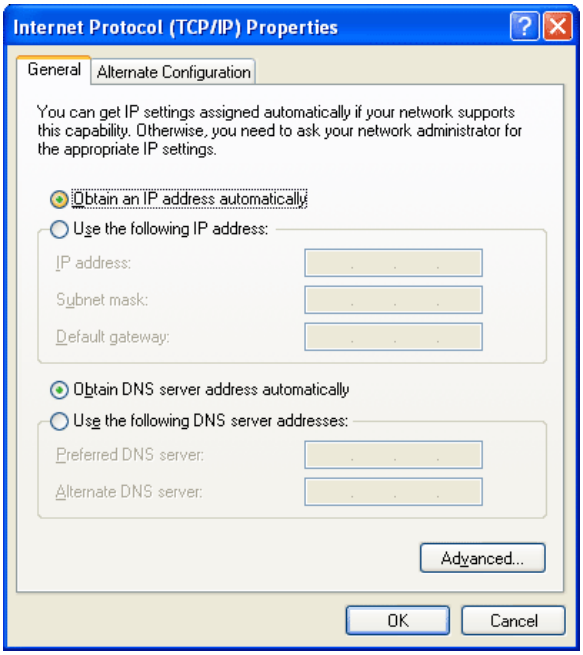
The 882 GSM Series modem is configured via the Internet which automatically allows your computer to obtain the proper IP address. For Windows XP users, select **Start** » **Control Panel** » **Network Connections**. Right click **Local Area Connection** and select **Properties** to open the configuration dialog box for Local Area Connection. See Figure 4.

Figure 4 Local PC Network Connections Screen



Find and select Internet Protocol (TCP/IP) from the list and click the Properties to open the TCP/IP configuration window (shown in Figure 5). Under the General tab, select Obtain an IP address automatically and Obtain DNS server address automatically. Click OK to complete TCP/IP configuration. Click Close button to complete the computer preparation for the 882 GSM Series modem.

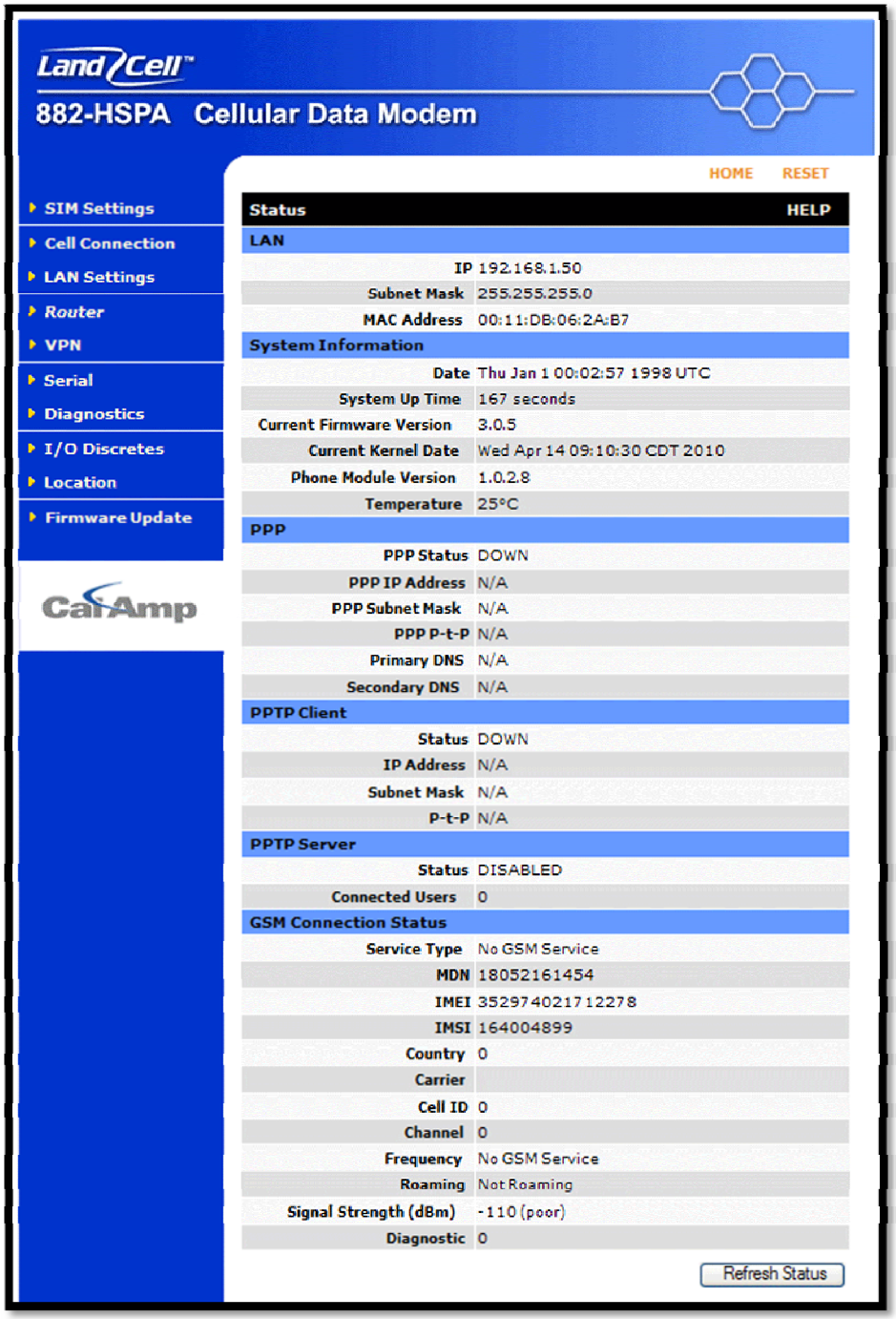
Figure 5 Internet Protocol (TCP/IP) Properties Screen



2.4 ACCESSING THE MODEM'S HOMEPAGE

Start your web browser and enter 192.168.1.50 in the address bar. A login screen should appear, enter the User Name: admin and the Password: password and click OK to log into the modem's Home Page (shown in Figure 6).

Figure 6 Configuration Home Page



2.4.1 LAN

- **IP:**
  Displays LAN side static IP information for this device (the modem). Note: Once this IP address has been changed and saved, the browser connection to the device will be lost. To continue configuration, please connect to the (new) IP address / the address that has been entered and saved.

- **Subnet Mask:**
  Displays the LAN side subnet mask for the modem.

- **MAC Address:**
  Media Access Control Address. Every Ethernet device (i.e. LAN cards) has a unique serial number hardware or MAC address to identify each Network Device from all others.

2.4.2 SYSTEM INFORMATION

- **Date:**
  Displays the current date and time (UTC) as received from the cellular carrier. The date and time information is updated at the start of each PPP connection, and then maintained internally until the modem is rebooted. If no PPP connection has been made this boot cycle, the time display will not be accurate. This is not a user settable function – it is controlled only by the carrier supplied date and time. Not all carriers support this function.

- **System Up time:**
  This timer is listed in seconds, i.e. 1 minute = 60 seconds of up time
  - 1 hour = 3600 seconds
  - 1 day = 86400 seconds
  - 1 year = 31,536,000 seconds

- **Current Firmware Version:**
  Displays the current modem firmware version loaded. Please visit www.calamp.com for the latest updates.

- **Kernel Date:**
  Displays the date of the operating system kernel the unit is running.

- **Phone Module Version:**
  This will vary depending on the vendor of the radio inside the module.

- **Temperature**
  Displays the current internal temperature of the modem, as measured by the cellular radio module.

2.4.3 PPP

- **PPP Status:**
  Indicates the status of the PPP interface, usually UP when connected properly.

- **PPP IP Address:**
  The current IP address of the Modem on the cellular network. This address, if public, should be reachable. 10.X.X.X subnets are not routable from the Internet.

- **PPP Subnet Mask:**
  Usually set to 255.255.255.255, but may be different depending on carrier.

- **PPP P-t-P:**
  The P-t-P address is your network access point, it may be possible to ping this address to determine if a PPP IP Address assigned is routable from the Internet.

- **Primary DNS:**
  The Primary DNS server, as assigned by the cellular carrier, when PPP is UP.

- **Secondary DNS:**
  The Secondary DNS server, as assigned by the cellular carrier, when PPP is UP.

2.4.4 PPTP CLIENT

- **Status:**
  Indicates the status of the PPTP Client interface, usually UP when connected properly. PPTP is the Point-to-Point Tunneling Protocol used to implement a Virtual Private Network (VPN).

- **IP Address:**
  The current IP address assigned to the modem by the VPN server.

- **Subnet Mask:**
  Usually set to 255.255.255.255, but may be different depending on VPN.

- **P-t-P:**
  The PPTP P-t-P is the LAN address of your VPN server.

2.4.5 PPTP SERVER

- **Status:**
  The PPTP Server is either ENABLED or DISABLED based on user's selection on VPN page.

- **Connected Users:**
  Number of users currently connected to the PPTP Server.

2.4.6 GSM CONNECTION STATUS

- **Service Type:**
  Determines the type of network your device has connected to; GPRS, EDGE, HSDPA, HSUPA, or HSPA. "Check SIM" will be displayed if the SIM is invalid, missing, or if the PIN needs to be entered.

- **MDN:**
  The Mobile Directory Number is the phone number assigned to the SIM card supplied by the carrier. The MDN may display “NOT AVAILABLE” if the PIN status is disabled or the MDN is unknown.

- **IMEI:**
  The International Mobile Equipment Identity is a unique 15-digit number that serves as the serial number of the GSM module in the modem.

- **IMSI:**
  The International Mobile Subscriber Identity is a unique number which designates the subscriber. This number is used for provisioning in network elements. The IMSI may display “NOT AVAILABLE” if a SIM card is not detected.

- **Country:**
  Country name or code associated with the GSM network.

- **Carrier:**
  Cellular provider name or code.

- **Cell ID:**
  Network Identifier, this is supplied automatically from the network.

- **Channel:**
  Cell Site channel number at which the modem is connected and is useful for the carrier in the event of troubleshooting.

- **Frequency:**
  Cellular frequency band the modem is using, 800MHz and 1900MHz are mainly in the US and outlying areas. In some cases 900 and 1800 will be seen for European or Foreign carriers.

- **Roaming:**
  Options are either Roaming or Not Roaming.

- **Signal Strength (dBm):**
  Measured in dBm, this is the Received Signal Strength Indicator (RSSI).

- **Diagnostic:**
  If this number is less than 128, it is the number of PPP connections made since the last reboot of the modem. If this number is 128 or more, the formula 128-Diagnostic value equals the number of times the cellular radio module has been reset.

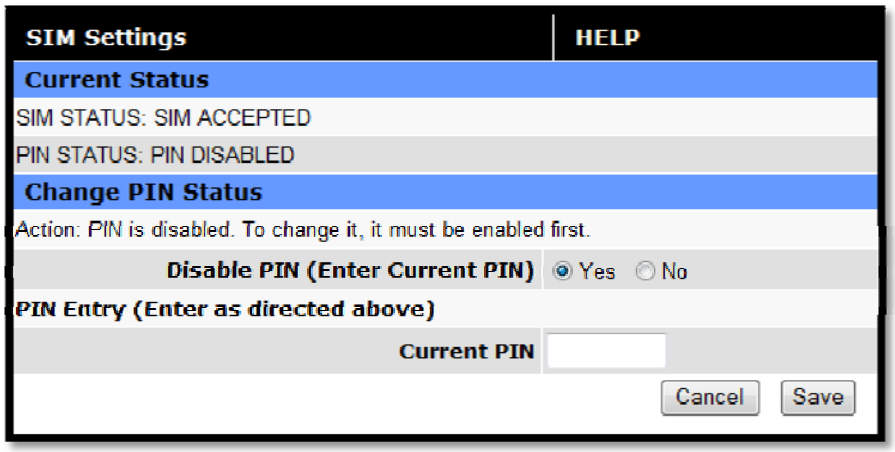
3 SIM SETTINGS

One of the key features of GSM is the Subscriber Identity Module (SIM), commonly known as a SIM card. The SIM is a detachable smart card containing the user's subscription information. This allows the user to retain his or her information after switching handsets. The SIM has a security feature which, when enabled, will require the user to enter a valid PIN before the modem will connect to the cellular network.

From the Home page, select SIM Settings from the left navigation panel to confirm the modem recognized the SIM card.

SIM STATUS should read ACCEPTED. PIN STATUS may show the PIN to be DISABLED or ACCEPTED. Refer to Section 3 for information on changing the PIN and PIN status.

Figure 7 SIM Settings Page

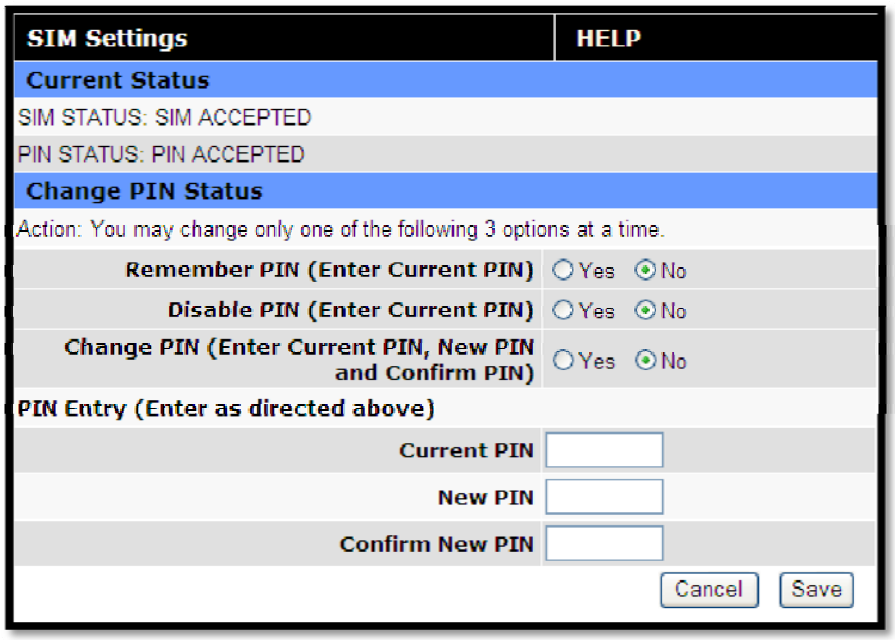


3.1 ENABLING PIN SECURITY

As shown in the previous section, the default setting for PIN Security is disabled. Before enabling the PIN Security feature, make sure you have the PIN number provided by your wireless carrier.

Change the Disable PIN setting from Yes (shown in Figure 7) to NO. Enter your carrier provided PIN into the Current PIN field. Click SAVE to access the PIN Security Settings (shown in Figure 8).

Figure 8 PIN ACCEPTED Security Enabled



The PIN security feature is now enabled. PIN STATUS shows that the PIN has been ACCEPTED. Each time modem power is cycled, the proper PIN will need to be entered in order for the modem to dial out. Upon restart, the PIN is entered from the SIM Settings page (shown in Figure 9). The PIN STATUS displays PIN REQUIRED, Enter PIN 3 attempts left.

3.2 PIN SECURITY OPTIONS

After PIN security has been enabled, the SIM page will display three options for changing the PIN functionality, **Remember PIN**, **Disable PIN**, or **Change PIN**. Only one of these options can be changed and saved at a time.

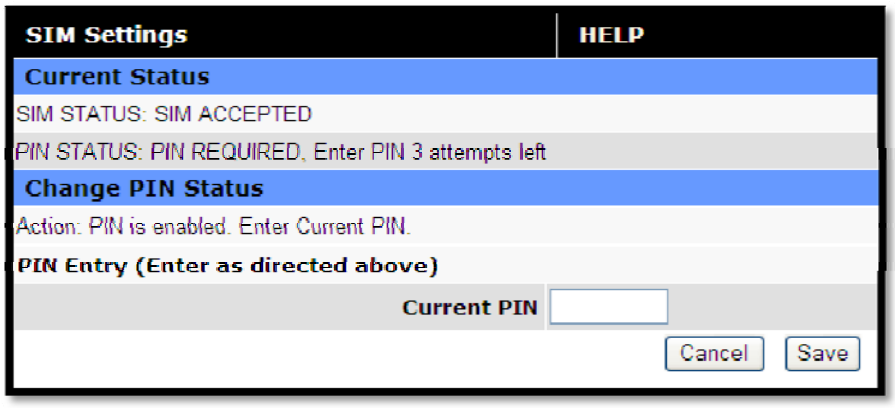
- **Remember PIN:**
  Selecting YES will allow the modem to remember the security PIN making it unnecessary to enter the PIN each time the modem tries to connect to the network. Selecting NO will set the modem to not remember the current PIN, requiring the user to enter the PIN when requested. Since only the modem remembers the PIN, using the SIM card in a different modem will require PIN authorization to dial out.

- **Disable PIN:**
  Selecting YES will disable the PIN security feature; the current PIN will need to be entered to allow disabling. A selection of NO indicates that PIN security is enabled.

- **Change PIN:**
  Selecting YES will allow the user to change the current PIN to a new one. Selecting NO will not require the user to change the PIN in the New PIN and Confirm PIN fields. When changing PINs, the user is required to input the current PIN, the new PIN, and the new PIN again in the fields provided.

After one of the options is changed, click the **SAVE** button to refresh the page showing the changes.

Figure 9 SIM Settings for PIN Required



At this point the user has 3 attempts to enter the correct PIN. If the correct PIN is not entered after 3 attempts, an unlock code or PIN Unblocking Key (PUK) from the service provider will be required before the SIM card is usable again. Figure 10 shows the SIM settings after an incorrect PIN has been entered.

Figure 10 SIM PIN Rejected

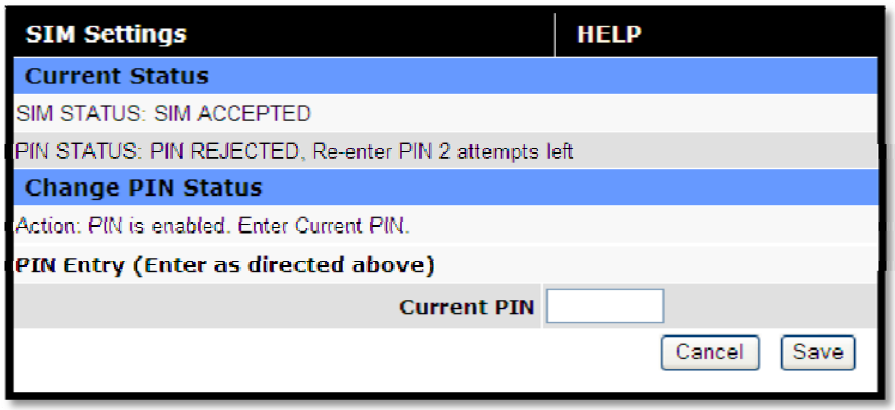
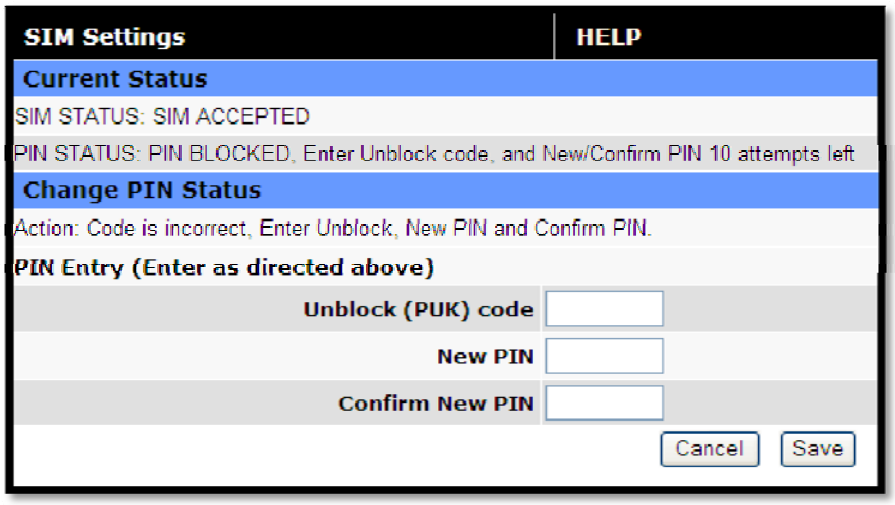


Figure 11 shows the SIM page requiring the unlock code to be entered. At this point the user has 10 attempts to enter the correct unlock code or the SIM card will be rendered unusable.

Figure 11 SIM PIN Unlock – Code Required



4 CELL CONNECTION

Select Cell Connection from the left navigation pane for user access to the Dial Settings, System Monitor and Dynamic DNS configuration screens.

4.1 DIAL SETTINGS

The Dial Settings tab opens the interface to configure dialing properties for initiating a data call with the cellular provider.

Figure 12 Dial Settings 882-GPRS/EDGE

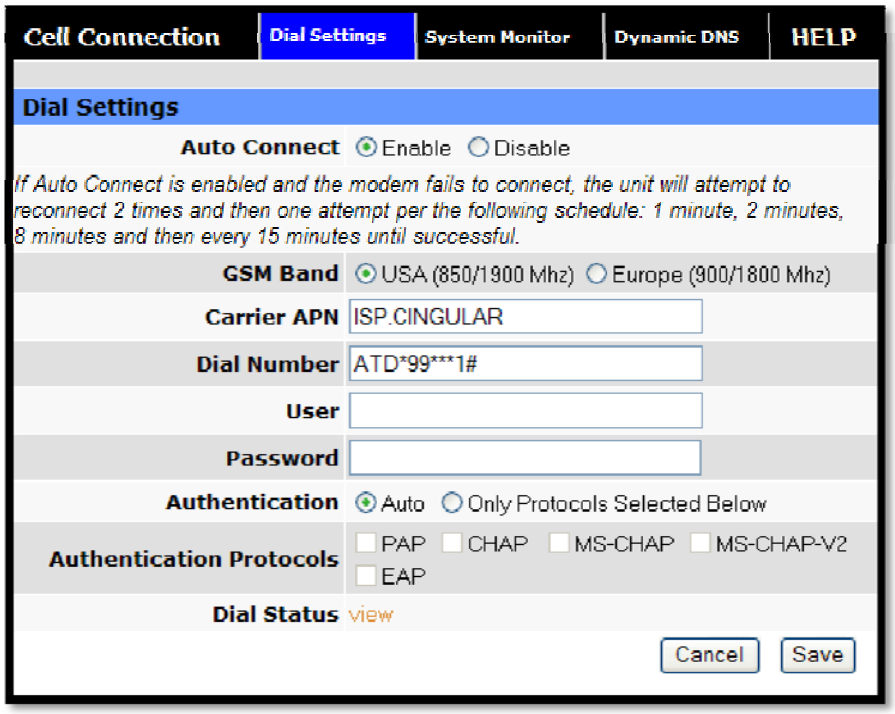
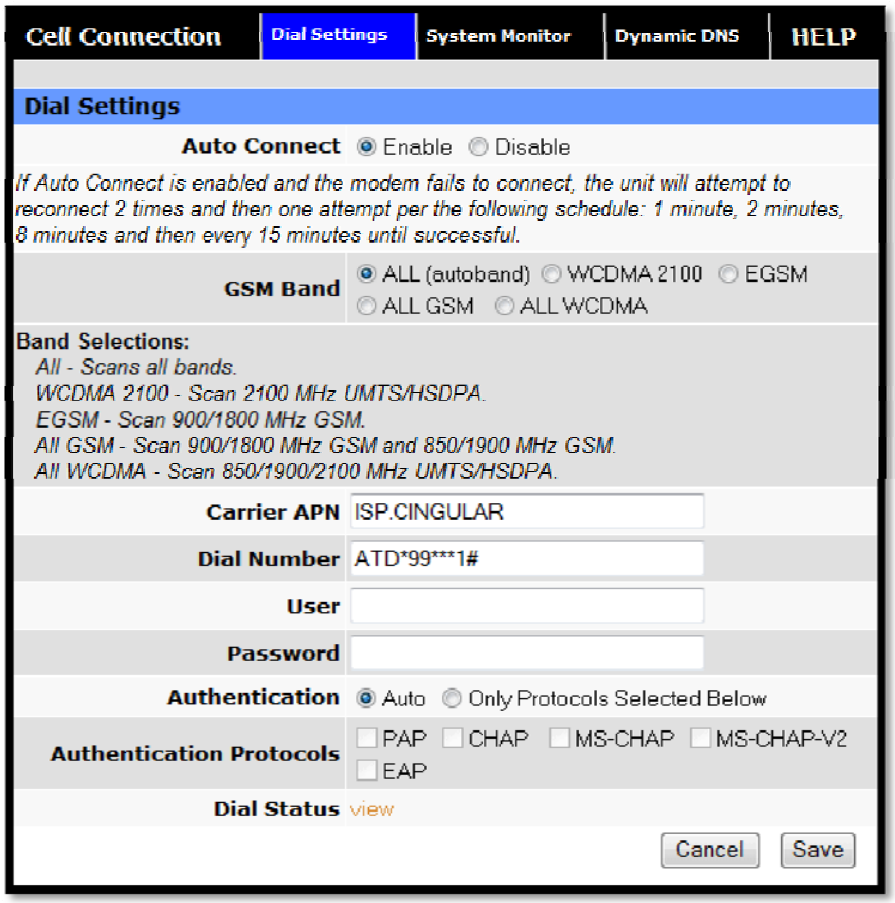


Figure 13 Dial Settings 882-HSPA



- **Auto Connect:**
  When set to **Enable**, will allow the modem to automatically dial the connection when the modem is powered. When set to **Disable**, the modem will not automatically dial the connection to the cellular provider and will not attempt to automatically re-connect when the connection has dropped.

- **GSM Band (GPRS/EDGE) (Shown in Figure 8):**
  Selecting USA sets the modem to use the 850/1900MHz GSM band. Selecting Europe sets the modem to use the 900/1800MHz GSM band.

- **GSM Band (HSPA) (Shown in Figure 9):**
  This option configures the modem to operate on only the selected bands (as shown in the Band Selections). CalAmp recommend leaving this on ALL.

  — **All**: All available bands will be accessible, commonly called autoband (default)
  — **WCDMA 2100**: Uses the 2100MHz frequency band used by the UMTS/HSDPA networks
  — **EGSM**: Uses the 900/1800MHz European GSM frequency band
  — **ALL GSM**: Can use any available GSM band. Europe (900/1800MHz) or USA (850/1900MHz)
  — **ALL WCDMA**: Can use any available WCDMA band, 850/900/2100 MHz in UMTS/HSDPA networks

- **Carrier APN:**
  The Access Point Name provided by the cellular provider required to access the network.

- **Dial Number:**
  Enter the phone number to initiate a data connection to the cellular provider via PPP. The default dial number is ATD*99***1#.

- **User:**
  Enter the username required by the cellular provider. If a user name is not required by your cellular provider, leave this field blank. *If used in combination with this modem's VPN Server, this username and password will also be valid on this modem's VPN Server.*

- **Password:**
  Enter the password required by the cellular provider. If a password is not required by your cellular provider, leave this field blank. *If used in combination with this modem's VPN Server, this username and password will also be valid on this modem's VPN Server.*

- **Authentication:**
  Selects the authentication protocol used. If Auto is selected, the LandCell will automatically select a protocol. If Only Protocols Selected Below is chosen, then the router will only accept requests for the specified protocols.

- **Authentication Protocols:**
  If Only Protocols Selected Below is chosen, then these fields are used to specify each Authentication protocol that router will accept. At least 1 must be selected. If Auto is selected, these choices will be disabled (greyed out).

- **Dial Status:**
  Click **view** to see a log from the last connection attempt. Example:

```
Starting GSM connect script...

Setting the abort string

Initializing modem

OK
Setting APN

OK
Dialing...

OK

CONNECT
Serial connection established.
using channel 1
Using interface ppp0
Connect: ppp0 <--> /dev/ttyUSB4
Warning - secret file /etc/ppp/pap-secrets has world and/or group access
sent [LCP ConfReq id=0x1 ]
rcvd [LCP ConfReq id=0x0 ]
```

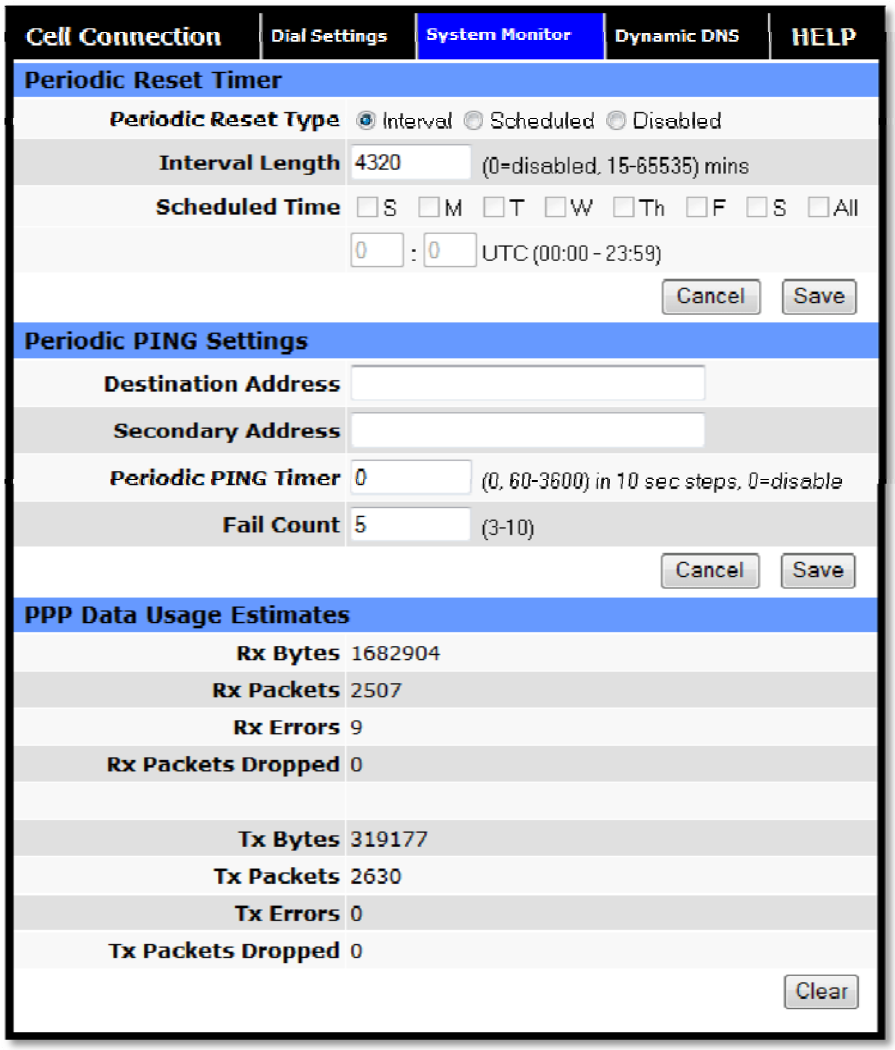
```
sent [LCP ConfAck id=0x0 ]
rcvd [LCP ConfAck id=0x1 ]
rcvd [LCP DiscReq id=0x1 magic=0x10f6f5d4]
rcvd [CHAP Challenge id=0x1 <669a0783bee129685eb6a39512221a2f>, name = "UMTS_CHAP_SRVR"]
Warning - secret file /etc/ppp/chap-secrets has world and/or group access
No CHAP secret found for authenticating us to UMTS_CHAP_SRVR
sent [CHAP Response id=0x1 <8b429146171077ff07bd81ca79ff846f>, name = "calamp"]
rcvd [CHAP Success id=0x1 ""]
CHAP authentication succeeded
CHAP authentication succeeded
sent [CCP ConfReq id=0x1 ]
sent [IPCP ConfReq id=0x1 ]
rcvd [LCP ProtRej id=0x2 80 fd 01 01 00 0f 1a 04 78 00 18 04 78 00 15 03 2f]
Protocol-Reject for 'Compression Control Protocol' (0x80fd) received
rcvd [IPCP ConfReq id=0x0]
sent [IPCP ConfNak id=0x0 ]
rcvd [IPCP ConfRej id=0x1 ]
sent [IPCP ConfReq id=0x2 ]
rcvd [IPCP ConfReq id=0x1]
sent [IPCP ConfAck id=0x1]
rcvd [IPCP ConfNak id=0x2 ]
sent [IPCP ConfReq id=0x3 ]
rcvd [IPCP ConfAck id=0x3 ]
Could not determine remote IP address: defaulting to 10.64.64.64
local IP address 32.178.24.53
remote IP address 10.64.64.64
primary DNS address 209.183.33.23
secondary DNS address 209.183.35.23
Script /etc/ppp/ip-up started (pid 450)
Script /etc/ppp/ip-up finished (pid 450), status = 0x0
```

The **SAVE** button must be pressed for changes to take effect.

4.2 SYSTEM MONITOR

Select Cell Connection from the left menu bar. The System Monitor tab allows user access to the configuration of additional self-monitoring for the modem to determine when service provider connections may have been terminated.

Figure 14 System Monitor Settings



4.2.1 PERIODIC RESET TIMER

- **Periodic Reset Type:**
  Sets the Periodic Modem Reset timer to an Interval time, a Scheduled day, or disables it.

- **Interval Length:**
  Sets the Periodic Modem Reset time from 15 to 65,535 minutes. The Periodic Reset is disabled when set to 0. Default is set to 4320 min (approximately 3 days).

- **Scheduled Time:**
  Sets the Periodic Modem Reset to occur at the specified time. Select the days of week desired or 'All' for everyday. Time is specified as Universal Time (UTC). The "home" page displays the current Universal Time. Universal Time is unaffected by Daylight Savings or other local time adjustments.

4.2.2 PERIODIC PING SETTINGS

- **Destination Address:**
  User may enter an accessible IP address or URL that will respond to a ping command.

- **Secondary Address:**
  User may enter an accessible IP address or URL that will respond to a ping command. This address will be used if the entered number of consecutive ping failures using the first address is reached.

- **Periodic Ping Timer:**
  User may enter an interval in increments of 10 seconds. The modem will ping the destination at that interval. Enter 0 to disable this feature.

- **Fail Count:**
  The modem will reset if the number of consecutive ping failures is equal to or greater than this entry and the secondary address is being used. Otherwise the modem will switch from the first address to the secondary address for the ping test.

4.2.3 PPP DATA USAGE ESTIMATES

This section tracks the data received from and transmitted to the cellular network. This is a tool that may be used to estimate network usage. These totals are tracked by the router. Your carrier maintains separate statistics from which your billing is determined. One way to use this tool is to track usage over a fairly short period of typical usage. The total then can be extrapolated to estimate longer time periods. This router updates these statistics once approximately every 30 seconds. Press the Clear button to reset the totals to 0.

- **Rx Bytes:**
  The total number of bytes received by the modem from the cell network. All statistics will be cleared automatically if this count exceeds 1 billion (1,000,000,000).

- **Rx Packets:**
  The total number of TCP and UDP packets received by the modem from the cell network.

- **Rx Errors:**
  The number of corrupted TCP and UDP packets received by the modem from the cell network.

- **Rx Packets Dropped:**
  The number of TCP and UDP packets received by the modem from the cell network that were not accepted. This may occur due to memory or throughput problems.

- **Tx Bytes:**
  The total number of bytes transmitted by the modem to the cell network. All statistics will be cleared automatically if this count exceeds 1 billion (1,000,000,000).

- **Tx Packets:**

The total number of TCP and UDP packets transmitted by the modem to the cell network.

- **Tx Errors:**
  The number of corrupted TCP and UDP packets received by the modem that were meant to be transmitted on the cell network.

- **Tx Packets Dropped:**
  The number of TCP and UDP packets received by the modem for transmit to the cell network that were not accepted. This may occur due to memory or throughput problems.

Press the **Clear** button to reset the totals to 0. These totals are NOT cleared by a modem reboot.

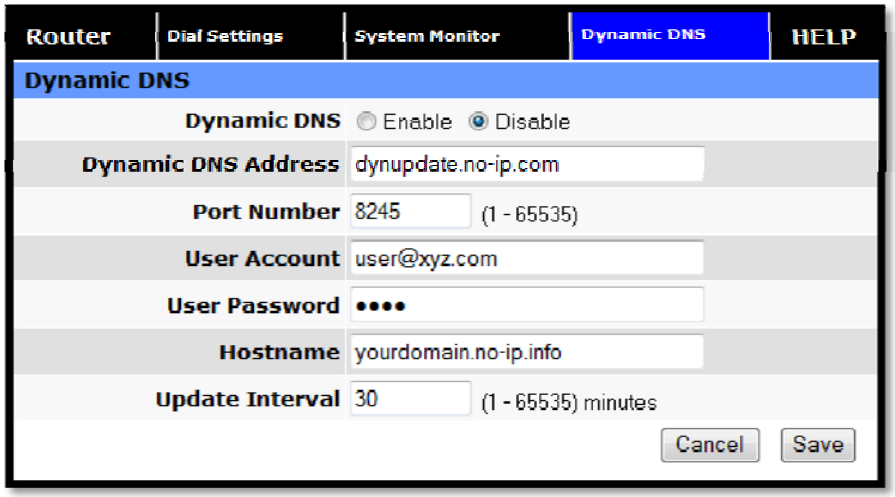
4.3 DYNAMIC DNS

Dynamic DNS is a system which allows the domain name data of a computer with a varying (dynamic) IP addresses held in a name server to be updated in real time in order to make it possible to establish connections to that machine without the need to track the actual IP address themselves at all times. A number of providers offer Dynamic DNS services ("DDNS"), free or for a charge. For example, a free service provided by No-IP allows users to setup between one and five host names on a domain name provided by No-IP.

No-IP is the default DNS service; it is the customer's responsibility to verify other Dynamic DNS services are NOIP compatible.

Select **Cell Connections** from the left navigation pane. Select the Dynamic DNS tab to open the Dynamic DNS configuration page. Dynamic DNS is a system which allows the domain name data of a computer with a varying (dynamic) IP addresses held in a name server to be updated in real time in order to make it possible to establish connections to that machine without the need to track the actual IP address themselves at all times. A number of providers offer Dynamic DNS services ("DDNS"), free or for a charge. For example, a free service provided by NO-IP allows users to setup between one and five host names on a domain name provided by NO-IP. No-IP is the default DNS service.

Figure 15 Dynamic DNS Settings



4.3.1 DNS CONFIGURATION

- **Dynamic DNS:**
  Selecting Enable will allow the modem to provide the selected service dynamic IP address information. Selecting Disable will stop any IP information from being sent to the selected service.

- **Dynamic DNS Address:**
  The internet address to communicate the Dynamic DNS information to. Default is dynupdate.no-ip.com.

- **Port Number:**
  The port number for the internet address give above. Default is 8245.

- **User Account:**
  The username used when setting up the account. Used to login to the Dynamic DNS service.

- **User Password:**
  The password associated with the username account.

- **Hostname:**
  The hostname identified to the Dynamic DNS service. For example http:/test.myserver.com.

- **Update Interval:**
  Sets the interval, in minutes (0 to 65,535), the modem will update the Dynamic DNS server of its carrier assigned IP address. It is recommended to set this interval as long as necessary. Each update is considered a data call by the cellular provider and could deplete low usage data plan minutes.

The **SAVE** button must be pressed for changes to take effect.

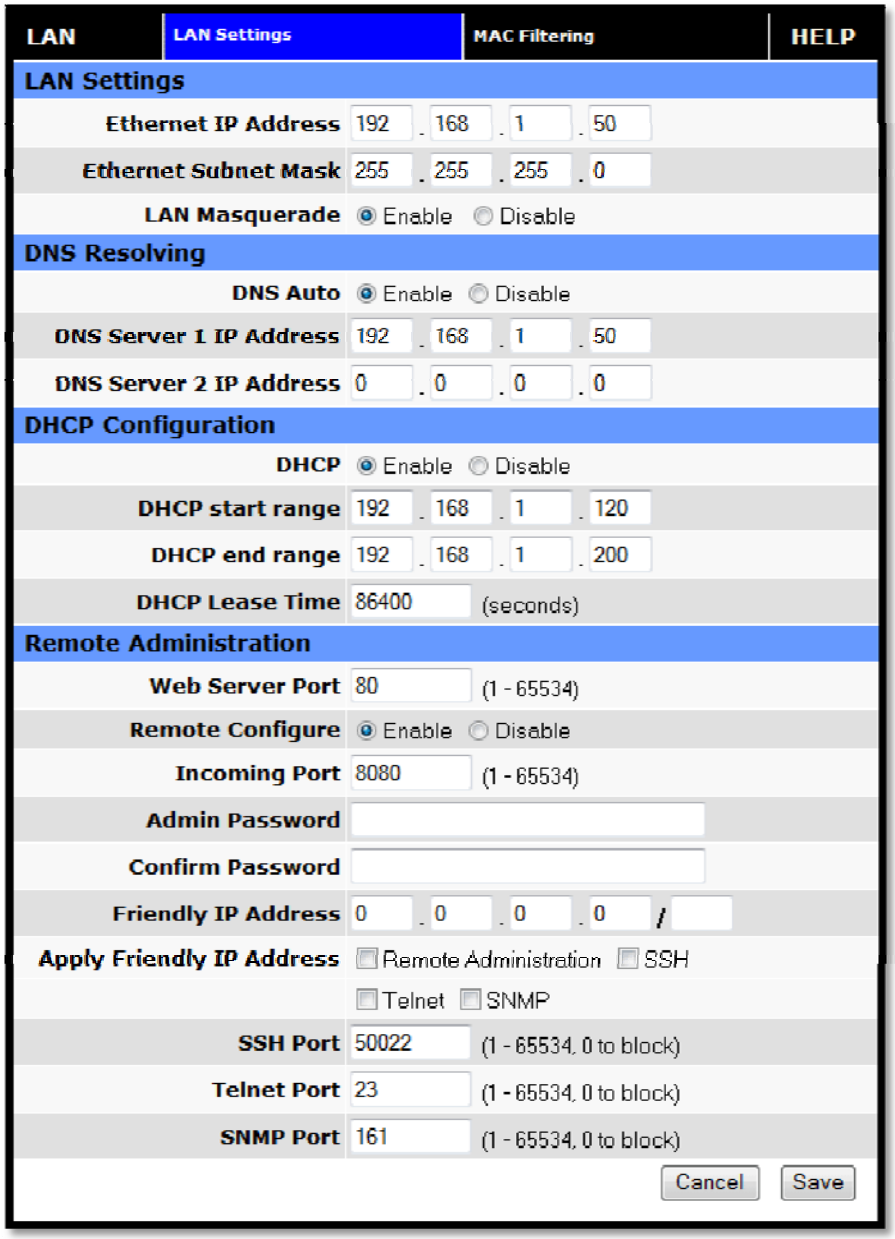
5 LAN SETTINGS

Select LAN Settings from the left navigation pane for user access to the LAN Settings and MAC filtering configuration screens.

5.1 LAN SETTINGS

Select **LAN Settings** from the left navigation pane to open the LAN settings configuration page (shown in Figure 16). From this page the modem's IP address, DNS settings, DHCP settings, and Remote Administration parameters are configured.

Figure 16 LAN Settings Configuration Page



5.1.1 LAN SETTINGS

- **Ethernet IP Address:**
  This sets the IP address of this device and is the address used to access the configuration pages. If the IP address changes you will have to re-enter the new IP address in your browser to access the configuration pages. The default IP is 192.168.1.50 and should be changed for security purposes.

- **Ethernet Subnet Mask:**
  Sets the subnet mask for the LAN side of the modem to the device.

- **LAN Masquerade:**
  When enabled the LandCell masquerades all Ethernet traffic to the LAN.

5.1.2 DNS RESOLVING

- **DNS Auto:**
  Selecting Enable will allow the servers set as DNS Server 1 or 2 to automatically resolve domain names to IP addresses. These servers communicate with name servers by sending DNS queries and heeding DNS responses. Selecting Disable will not allow DNS Sever 1 or 2 to resolve domain names.

- **DNS Server 1 IP Address:**
  The Ethernet IP address of the preferred DNS server. The default address is 192.168.1.50, the same as the LAN Ethernet IP Address for the modem. If the LAN Ethernet ID Address changes, the DNS Server 1 address will automatically change to the same.

- **DNS Server 2 IP Address:**
  Ethernet address of the alternate DNS server. The default is set to 0.0.0.0.

5.1.3 DHCP CONFIGURATION

- **DHCP:**
  Dynamic Host Configuration Protocol; a protocol used by client devices that are connected to the LAN port of this device to automatically obtain an IP address assigned by this device. Selecting Enable will configure this device to assign IP addresses to client devices taken from a pool specified by the values entered in DHCP start range and DHCP end range. Selecting Disable will turn off this DHCP server functionality.

- **DHCP start range:**
  DHCP server starting IP address. The default is set as 192.168.1.100.

- **DHCP end range:**
  DHCP server ending IP address. The maximum usable number is 253.

- **DHCP Lease Time:**
  Sets the duration, in seconds, the connected device is allowed to keep the assigned IP address. In many cases it is possible for the device to receive the same IP address after the lease time expires.

5.1.4 REMOTE ADMINISTRATION

- **Web Server Port:**
  Enter the port number to be used by the web server.

- **Remote Configure:**
  Selecting Enable will allow remote access to the modem's configuration screens through the cellular network connection. Selecting Disable will shut off the ability to remotely access the modem's configuration screens.

- **Incoming Port:**
  Sets the port number used to remotely configure the modem.

- **Admin Password:**
  Sets the password required for remote configuration.

- **Confirm Password:**
  Re-type the Admin Password to confirm the correct spelling.

- **Friendly IP Address:**
  Specifies the IP address from which remote administration is permitted. Entering 0.0.0.0 will allow any IP address. Leave the fifth box blank (after the /) if specifying a specific IP, or 0.0.0.0. A subnet mask may be entered in the fifth box. The mask indicates how many bits of the IP address to match. This can be a value from 1 to 32.

- **Apply Friendly IP Address:**
  Check the box next to a service to allow remote access to the service only from the friendly IP address. Unchecking the box will allow any IP address access.

- **SSH, Telnet, and SNMP Ports:**
  Enter the port number that will be used for remote access to the service. Entering zero for the port number will block remote access to the service.

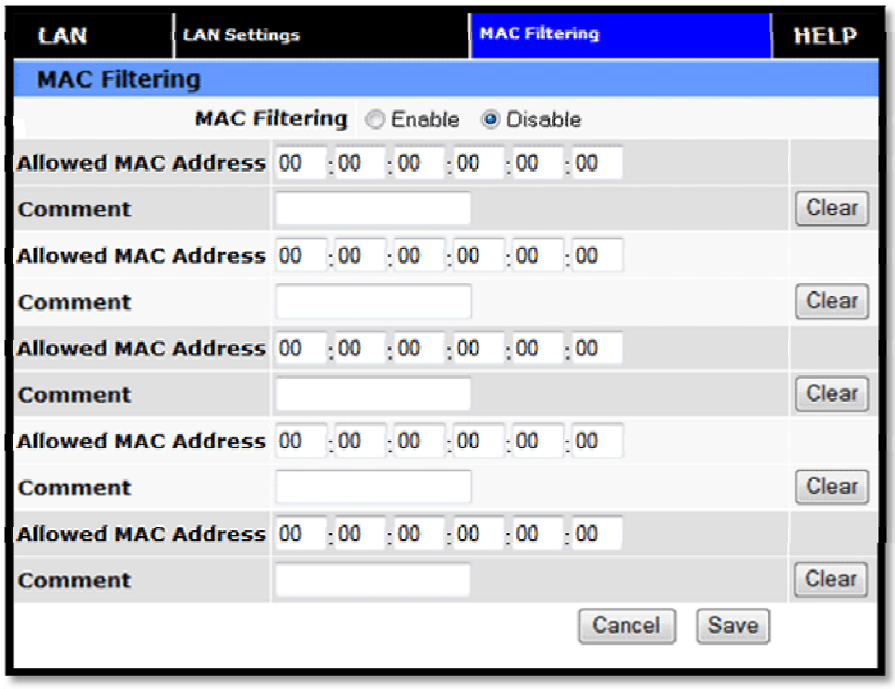
Pressing the **Cancel** button will redisplay the last saved parameters for this page. It can be used to abort changes before the Save button is pressed.

Pressing the **Save** button will save the currently displayed value for each parameter. Once Save is pressed, Cancel cannot be used to return to previous settings.

5.2 MAC FILTERING

Select **LAN Settings** from the left navigation pane. The MAC Filtering tab opens the MAC filtering configuration page. MAC filtering allows up to five unique device MAC addresses access to the network.

Figure 17 MAC Filtering Configuration Page



- **MAC Filtering:**
  Select **Enable** to allow MAC filtering; Up to five unique MAC addresses can be allowed to access the network.
  Select **Disable** to stop the MAC filtering functionality.

- **Allowed MAC Address:**
  Input MAC address to be allowed access to the network. Up to five addresses may be input.

- **Comment:**
  Input name or short description of the device using the allowed MAC address. This field is limited to 32 characters.

Select **Clear** to remove the MAC address from the list of allowed addresses.

The **SAVE** button must be pressed for changes to take effect.

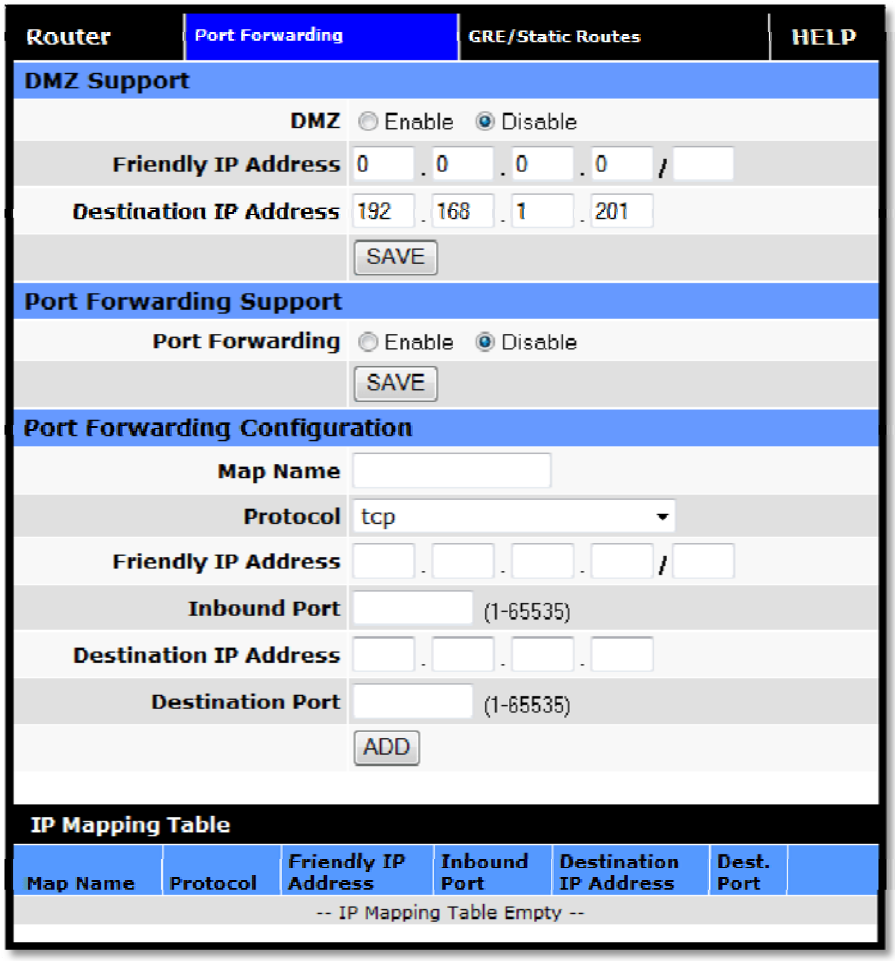
6 ROUTER

Select Router from the left navigation pane for user access to Port Forwarding and GRE/Static Routing tabs.

6.1 PORT FORWARDING

Port Forwarding is a technique for transmitting and receiving network traffic through a router that involves re-writing the source and/or destination IP addresses and usually the TCP/UDP port numbers of IP packets as they pass through. The various routing configurations will be displayed in the IP mapping table at the bottom of the screen.

Figure 18 Port Forwaring Configuration Page



DMZ is a host on the internal network that has all ports exposed, except those ports forwarded otherwise.

6.1.1 DMZ SUPPORT

- **DMZ:**
  When set to Enable, will allow the modem to use DMZ routes using the address set in the Destination IP Address. When set to Disable, will shut down the DMZ functionality. The SAVE button must be pressed for changes to take effect.

- **Friendly IP Address:**
  Optionally restricts DMZ access to only the specified IP address. If set to "0.0.0.0", the DMZ is open to all incoming IP Addresses.

- **Destination IP Address:**
  The IP address which has all ports exposed, except ports defined in the Port Forwarding configuration.

The SAVE button must be pressed for changes to take effect.

6.1.2 PORT FORWARDING SUPPORT

- **Port Forwarding:**
  When set to Enable, will allow the modem to use the Port Forwarding routes described in the IP mapping table. When set to Disable, will shut down the Port Forwarding functionality.

The SAVE button must be pressed for changes to take effect.

6.1.3 PORT FORWARDING CONFIGURATION

- **Map Name:**
  Sets the Map Name for the IP mapping table at the bottom of the screen. The Map Name can be up to ten characters in length. Do not use spaces in the character string.

- **Protocol:**
  Sets the data protocol as either tcp, udp, or all.

- **Friendly IP Address:**
  Specifies an IP address that is allowed to access the modem or a wildcard IP address of 0.0.0.0 that allows all IP addresses to access the modem. Leave the fifth box blank (after the /) if specifying a specific IP, or 0.0.0.0. A subnet mask may be entered in the fifth box. The mask indicates how many bits of the IP address to match. This can be a value from 1 to 32.

- **Inbound Port:**
  Sets the external port number for incoming requests.

- **Destination IP Address:**
  Sets the Local Area Network Address of the device connected to the modems Ethernet Jack. Inbound requests will be forwarded to this IP address.

- **Destination Port:**
  Sets the Local Area Network port number used when forwarding to the destination IP address.

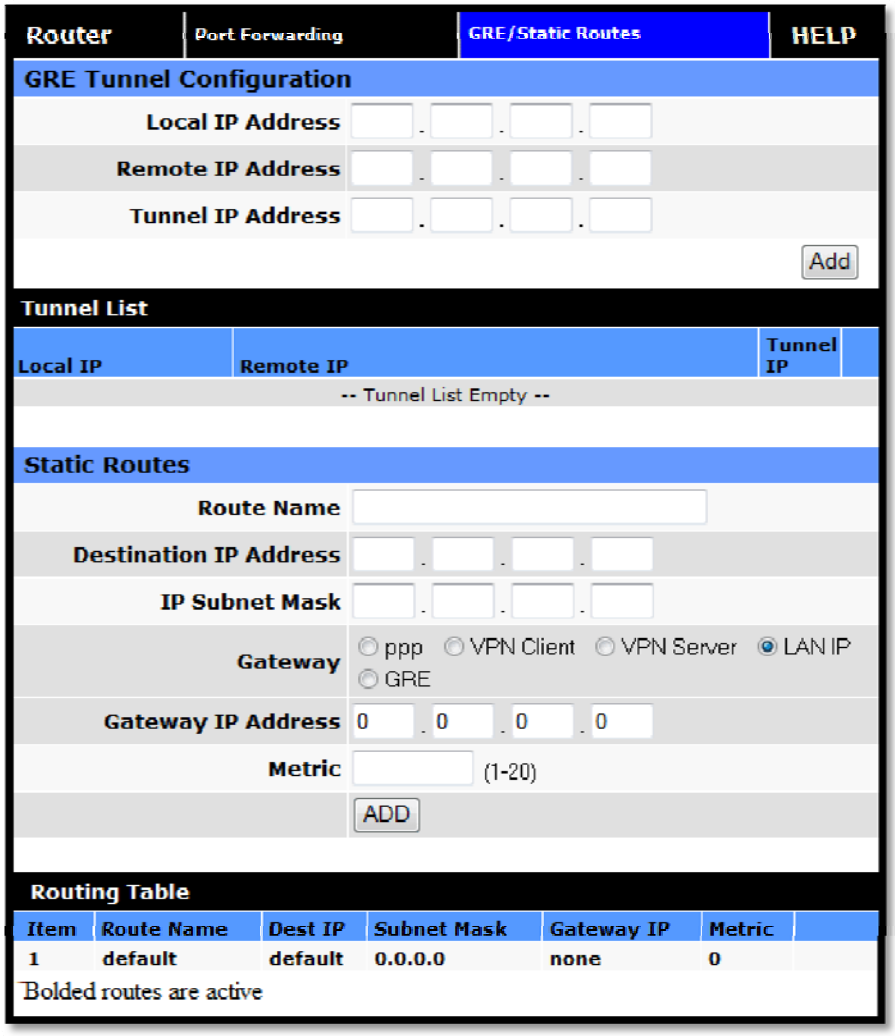
Once you have completed the entry of the above fields, press the **ADD** button to save the new entry.

6.2 GRE/STATIC ROUTES

Select the GRE/Static Routes tab to open the routing configuration page. The GRE screen is used to add and delete GRE tunnels. Static routes may be necessary to route desired traffic through a particular tunnel.

Static Routing refers to a manual method used to set up routing between networks. Static route tables are created from the Routing screen and appear at the bottom of the window.

Figure 19 GRE/Static Routes Configuration Page



6.2.1 GRE TUNNEL CONFIGURATION

- **Local IP Address:**
  The local IP address associated with the tunnel.

- **Remote IP Address:**
  The remote IP address associated with the tunnel.

- **Tunnel IP Address:**
  The IP address assigned to the tunnel interface.

6.2.2 STATIC ROUTES

- **Route Name:**
  Sets the alphanumeric identifier of the static route in the Static Route Table.

- **Destination IP Address:**
  Routes matching this destination IP address will be routed to the static route defined in the Local IP address field.

- **IP Subnet Mask:**
  Sets the subnet mask of the destination network.

- **Gateway:**
  Sets ppp (this router's wireless internet connection), pptp (VPN), GRE Tunnel, or the local network IP address for the gateway to the destination network.

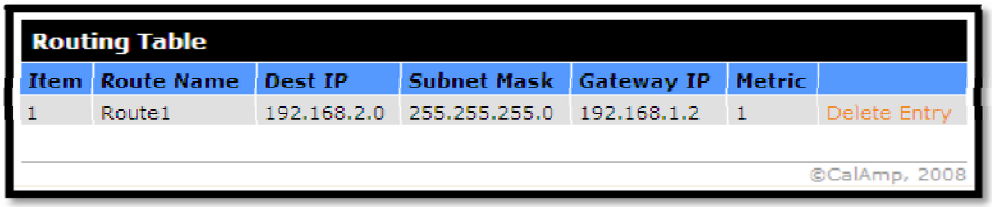
- **Gateway IP Address:**
  This is only used if local IP addr was selected for gateway. Enter the address of the local gateway.

- **Metric:**
  Enter a value from 1 to 20. The lower the metric value entered, the higher the route priority.

The **ADD** button must be pressed to add the configured route to the Static Route Table.

As an example, if a router connected on the Ethernet side of the modem has a gateway IP address of 192.168.1.2 and is interfaced to network 192.168.2.0 the following would be entered in the Static Route Table to allow a device to get on the 192.168.2.0 network. Set the Route Number to 1, name the Route (i.e. Route1), set the destination IP Address to 192.168.2.0, set the IP Subnet Mask to 255.255.255.0, set the Gateway IP Address to 192.168.1.2, and set the Metric to 1. The entry will be made in the Static Route Table, **Figure 20** below.

Figure 20 Static Route Table Example



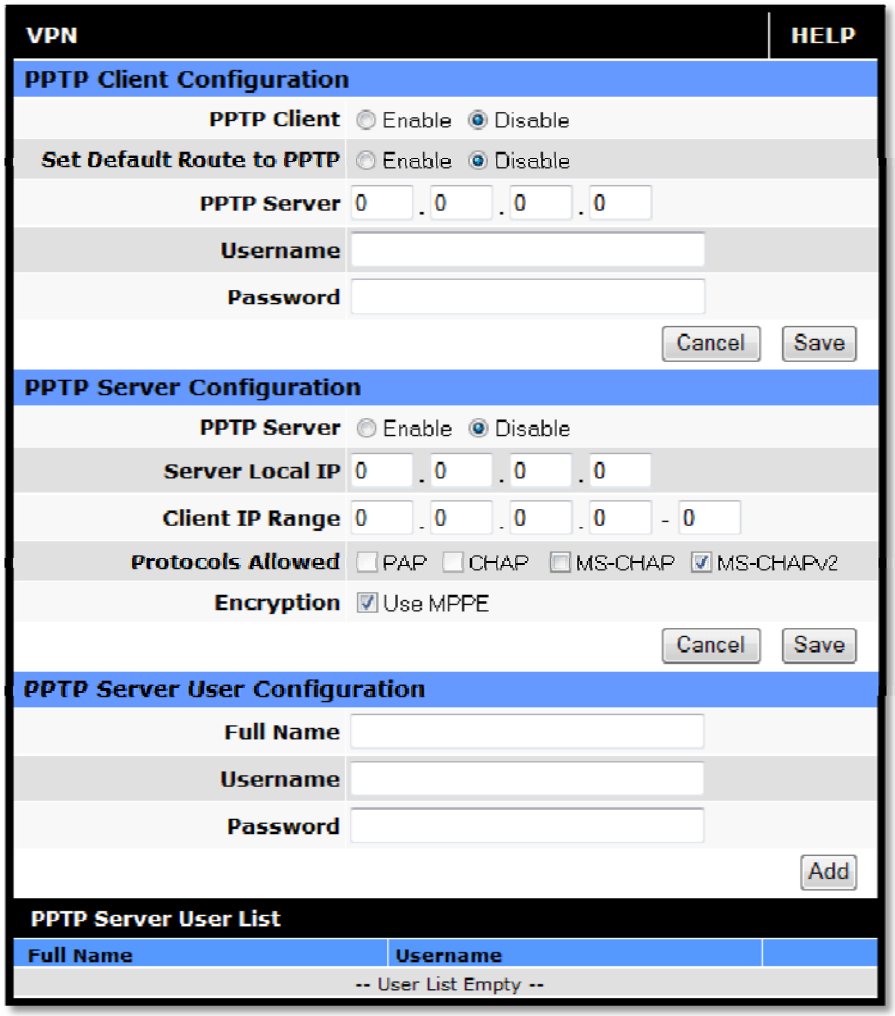
Routing Table

Item	Route Name	Dest IP	Subnet Mask	Gateway IP	Metric	
1	Route1	192.168.2.0	255.255.255.0	192.168.1.2	1	Delete Entry

7 VPN

Select VPN from the left navigation pane to display the Point-to-Point Tunneling Protocol (PPTP) configuration page. PPTP is a method to implement a virtual private network (VPN).

Figure 21 VPN Configuration Page



7.1.1 PPTP CLIENT CONFIGURATION

- **PPTP Client:**
  Selecting Enable will allow the PPTP functionality. Selecting Disable will shut off PPTP functionality.

- **Set Default Route to PPTP:**
  Selecting Enable will route all IP traffic through the PPTP network. Selecting Disable will route only PPTP traffic through the PPTP network.

- **PPTP Server:**
  The IP address of the virtual private network server on which to connect.

- **Username:**
  The username required by the VPN server.

- **Password:**
  The password, associated with the username, required by the VPN server.

The **SAVE** button must be pressed for changes to take effect.

7.1.2 PPTP SERVER CONFIGURATION

- **PPTP Server:**
  Selecting Enable starts the VPN server, and selecting Disable stops it.

- **Server Local IP:**
  The IP address that clients will use to communicate with the server after they connect.

- **Client IP Range:**
  The pool of IP addresses assigned to clients.

- **Protocols Allowed:**
  Selecting a protocol will instruct the VPN server to accept clients who use that protocol. The server will reject clients using any of the un-selected protocols.

- **Encryption:**
  Selecting 'Use MPPE' will enable Microsoft Point-to-Point Encryption for communication between the server and clients. This option requires the MS-CHAP or MS-CHAPv2 protocol.

The **SAVE** button must be pressed for changes to take effect.

7.1.3 PPTP SERVER USER CONFIGURATION

- **Full Name:**
  This name can be used as a more descriptive name for a client. It is not used by the server. No spaces are allowed in the name.

- **Username:**
  The name used by a client to log in to the server.

- **Password:**
  The password, with associated username, used by a client to log in to the server.

Press the **Add** button to save the new entry.

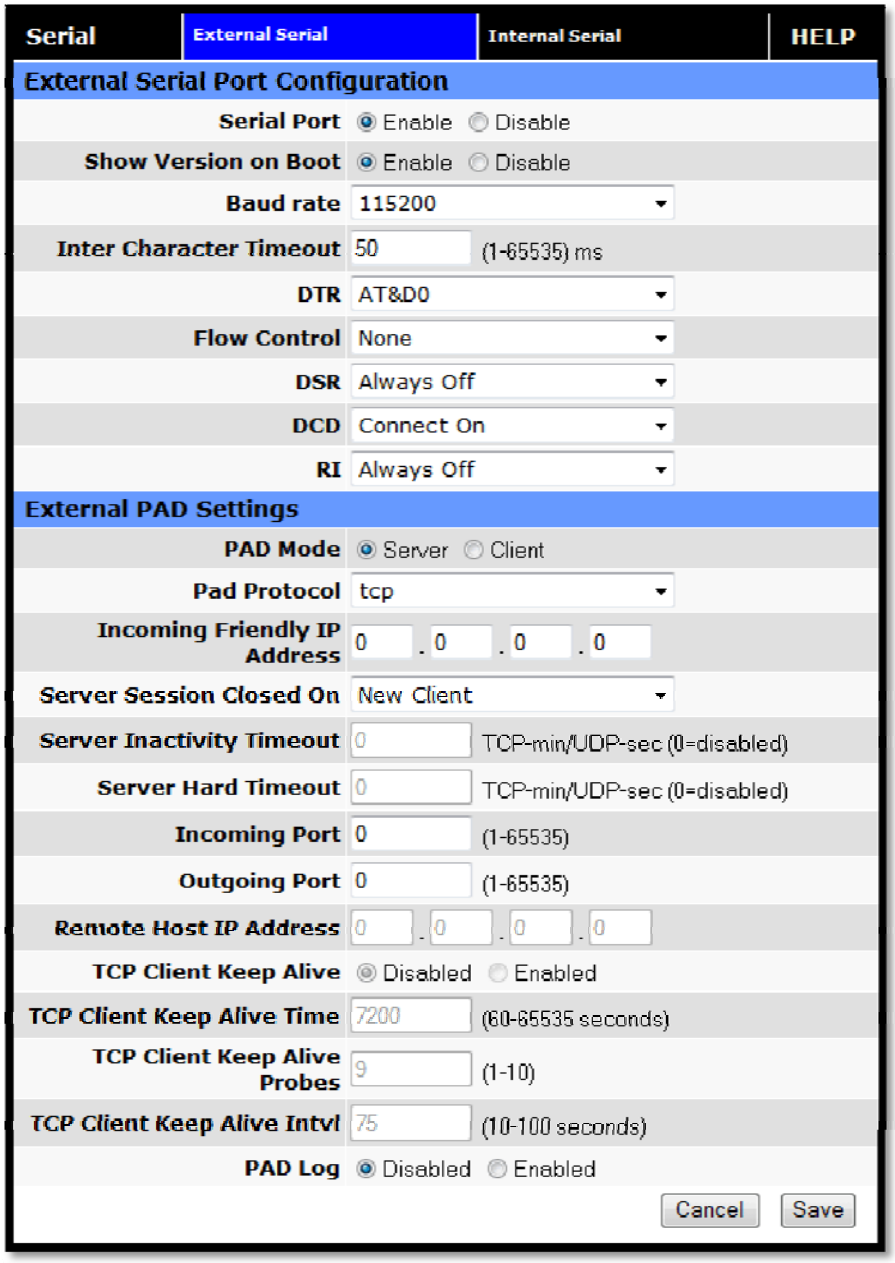
8 SERIAL

Selecting Serial from the left menu bar for access to the External and Internal Serial tabs.

8.1 EXTERNAL SERIAL

The External Serial screen is used to configure the RS-232 Serial Port parameters and Packet Assembler and Dis-assembler (PAD) functionality. This acts as a serial to IP (and IP to serial) converter without the need to purchase a separate serial to IP converter.

Figure 22 External Serial Port Configuration Page



- **Serial Port:**
  When enabled, the external serial port PAD function can be used. When disabled, no PAD function is available, and the port is left free, for use by an ODP application.

- **Show Version on Boot:**
  When enabled, the router model number and firmware version are transmitted out the serial port at router boot. Additionally, "OK" is transmitted when router is ready to receive data and when PPP connection is made. When disabled, these indicators will not be transmitted out the serial port.

- **Baud Rate:**
  Sets the baud rate of the serial port. Settings may range from 300 to 115,200 bits per second. The default baud rate is 115,200 bps.

- **Inter Character Timeout:**
  Enter a value from 1 to 65,535 to set the interval between packets being sent.

- **DTR:**
  Select to define the Data Terminal Ready behavior. See Table 6 for Value options and their definitions.

Table 6 – DTR Settings

Value	Definition
AT&D0	Ignore DTR.
AT&D1	If in the Online Data State, upon an on-to-off transition of DTR, the modem enters Online Command State and issues an OK result code; the call remains connected. Otherwise, ignore DTR.
AT&D2	If in the Online Data State or Online Command State upon an on-to-off transition of DTR, the modem performs an orderly clear-down of the call and returns to the command state. Automatic answer is disabled while DTR remains off.
AT&D4	The modem auto-dials the default remote station upon an off-to-on transition of DTR and enters the Online Data State. The modem ends the call and enters the command state upon an on- to-off transition of DTR.
AT&D5	The modem auto-dials the default remote station upon an on-to-off transition of DTR and enters the Online Data State. The modem ends the call and enters the command state upon an off-to-on transition of DTR.
AT&D6	Upon an on-to-off transition of DTR, the modem performs an orderly clear-down of any session and turns OFF the RF module. Upon an off-to-on transition of DTR, the modem turns ON the RF module and reestablishes the radio session.
AT&D7	Upon an on-to-off transition of DTR, the modem performs an orderly clear-down of any session and turns OFF the RF module. Upon an off-to-on transition of DTR, the modem turns ON the RF module and reestablishes the radio session.
AT&D8	The modem auto-dials the default remote station upon determining DTR is OFF and enters the Online Data State. The modem ends the call and enters the command state upon determining DTR is ON.
AT&D9	The modem auto-dials the default remote station upon determining DTR is ON and enters the Online Data State. The modem ends the call and enters the command state upon determining DTR is OFF.

- **Flow Control:**
  Sets the Flow Control to None or Hardware control.

- **DSR:**
  Sets the Data Set Ready to Always On, On When Available, On When Connected or Always Off. The DSR parameter determines how the modem controls the state of the Data Set Ready circuit. The default value is Always Off.

  — Always On: DSR is always on.
  — On When Available: DSR is on when the RF signal present and phone registered on network.
  — On When Connected: DSR is on when connected to CDMA.
  — Always Off: DSR is always off.

- **DCD:**
  The DCD parameter determines how the modem controls the state of the Carrier Detect circuit and the amber DCD LED on the front panel. The default value is Connect On.

  — Always On: DCD is always on.
  — Connect On: DCD is on when connected to a remote host.
  — Always Off: DCD is always off.

- **RI:**
  The RI parameter determines how the modem controls the state of the Ring Indicator circuit. The default value is Always Off.

  — Always On: RI is always on.
  — Connect On: RI tracks incoming ring pulse.
  — Always Off: RI is always off.

8.1.1 EXTERNAL PAD SETTINGS

- **PAD Mode:**
  Select button to set the PAD mode of the modem as a Server or Client.

  — **Server mode** waits for inbound TCP connections from remote client or UDP data being sent to the external modem's IP address. For example, server mode can be used for mobile termination calls. When in server mode, it is possible for the connected serial device to make an outbound TCP or UDP connection when an AT Command is issued (remote IP address: port number, e.g. ATD*166.23.42.10:5000).

  — **Client mode** keeps an always-on TCP connection to a remote server or sends all UDP to the IP address and port number specified. For example, client mode can be used for mobile origination calls.

Note: It is possible to override Server mode and make an outgoing client connection using the RS-232 command set.

atd*xxx.xxx.xxx.xxx – When in server mode, and no connection is active, the atd* command (followed by an IP address) can be issued to initiate an outbound client connection to the specified IP address and Outgoing Port parameter. To hang-up such a connection, 3 '+' characters must be inserted into the outgoing stream ("+++"). The modem will return to command mode once it has seen the "+++" and respond with OK. The connection can then be broken by entering "ath". The modem will return to server mode. Such a client connection can be repeated again as necessary, as long as each connection is hung-up before a new one is made.

Additional note: The modem is capable of only 1 PAD connection at a time. When a manual client connection is in progress (atd*xxx.xxx.xxx.xxx), a connection attempt by an incoming client may result in the disabling of the PAD function until the next device reset.

- **Pad Protocol:**
  Sets the data protocol of the PAD to tcp or udp data. If you have set PAD Mode as server you can choose either to support either type of client.

- **Incoming Friendly IP Address:**
  Sets the IP address of the device using the PAD functionality.

- **Server Session Closed On:**
  This is only available if PAD mode is Server. This option selects under which condition the server will terminate an established connection. The default value is New Client.

  — **New Client:** If a different client attempts to connect, it will be successful and the current client will be forcibly disconnected, without any warning. Otherwise, the current client remains connected indefinitely.

  — **Timeout:** A new client will be accepted only after a specified timeout. The duration of the timeout is specified by the Inactivity timeout, or the Hard timeout, or a combination of both.

- **Server Inactivity Timeout:**
  Time after which the current connection with Client will be terminated without warning. This time starts over again each time the Client sends data to the server. This parameter is ignored if the session closes on New Client. If PAD protocol is tcp, the timeout is specified in minutes. If udp, the timeout is specified in seconds. The valid range for either is 1-65535. 0 will disable this timer.

- **Server Hard Timeout:**
  Time after which the current connection with Client will be terminated without warning. This is a fixed time from the initial connection, no matter how much or how often the Client sends data to the server. This parameter is ignored if the session closes on New Client. If PAD protocol is tcp, the timeout is specified in minutes. If udp, the timeout is specified in seconds. The valid range for either is 1-65535. 0 will disable this timer.

Note: If both Inactivity Timeout and Hard Timeout are enabled, (neither is 0), then a client session will be terminated when either timeout is met. In this case, the value for Hard Timeout must exceed the value for Inactivity Timeout. If the Inactivity Timeout is met, the client will be terminated. If the Hard Timeout is exceeded without meeting the Inactivity Timeout, the client will be terminated by the Hard Timeout.

- **Incoming Port:**
  Sets the port number used to forward incoming requests to the serial port.

- **Outgoing Port:**
  Sets the port number used to send outgoing requests from the serial port.

- **Remote Host IP Address:**
  Sets the Server IP address to connect with when using the PAD in client mode.

- **TCP Client Keep Alive:**
  When in client mode and enabled, TCP Keep Alive packets will be sent from the client to the server periodically in order to detect a broken connection. The modem will automatically try to re-establish the connection if necessary. Changing this setting will affect the use of TCP Keep Alive on the next client session. It will not affect an existing session.

- **TCP Client Keep Alive Time:**
  Time in seconds between keep alive cycles. A keep alive cycle will consist of one or more keep alive probes separated by the keep alive interval.

- **TCP Client Keep Alive Probes:**
  Number of keep alive packets that must fail before connection is considered closed.

- **TCP Client Keep Alive Intvl:**
  Time in seconds after which a keep alive packet is considered to be failed (if not acknowledged). Another packet is sent at this time if TCP Client Keep Alive Probes limit has not been reached.

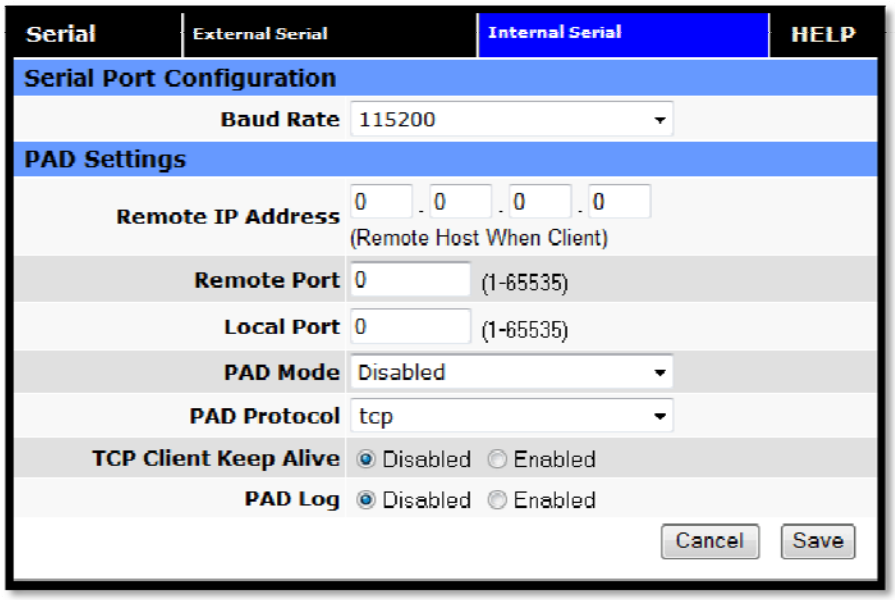
- **PAD Log:**
  When enabled, as data passes through the PAD, a copy is stored in a log file located on the modem at /tmp/padlog. The log will stop saving data when full and data is lost at modem reset.

The **SAVE** button must be pressed for changes to take effect.

8.2 INTERNAL SERIAL

Select Serial from the left navigation page. Select the Internal Serial tab to open the serial port and PAD settings page. The Internal Serial screen is used to configure the internal RS-232 Serial Port parameters and Packet Assembler and Dis-assembler (PAD) functionality. The PAD feature allows requests that come in on a specific port to be forwarded to the internal serial port.

Figure 23 Internal Serial Port Configuration Page



8.2.1 SERIAL PORT CONFIGURATION

- **Baud Rate:**
  Sets the baud rate of the serial port. Settings may range from 300 to 115,200 bits per second. The default baud rate is 115,200 bps.

8.2.2 PAD SETTINGS

- **Remote IP Address:**
  Sets the IP address of the device using the PAD functionality.

- **Remote Port:**
  Sets the port number used by the remote device to accept requests from the LandCell.

- **Local Port:**
  Sets the port number used by the LandCell to accept requests from the remote device.

- **PAD Mode:**
  Select buttons to set the PAD mode of the LandCell as a Server or Client.

- **Pad Protocol:**
  Sets the data protocol of the PAD to TCP or UDP data.

- **TCP Client Keep Alive:**
  When in client mode and enabled, TCP Keep Alive packets will be sent from the client to the server periodically in order to detect a broken connection. The modem will automatically try to re-establish the connection if necessary.

Changing this setting will affect the use of TCP Keep Alive on the next client session. It will not affect an existing session. When this option is enabled, the timing and number of Keep Alive attempts is controlled by parameters defined on the External Serial page. It is not possible to have different timing settings for each serial port.

- **PAD Log:**
  If enabled, a log of the data passed through the modem is saved at /tmp/intpadlog. The log will stop saving data when full and data is lost at modem reset.

The **SAVE** button must be pressed for changes to take effect.

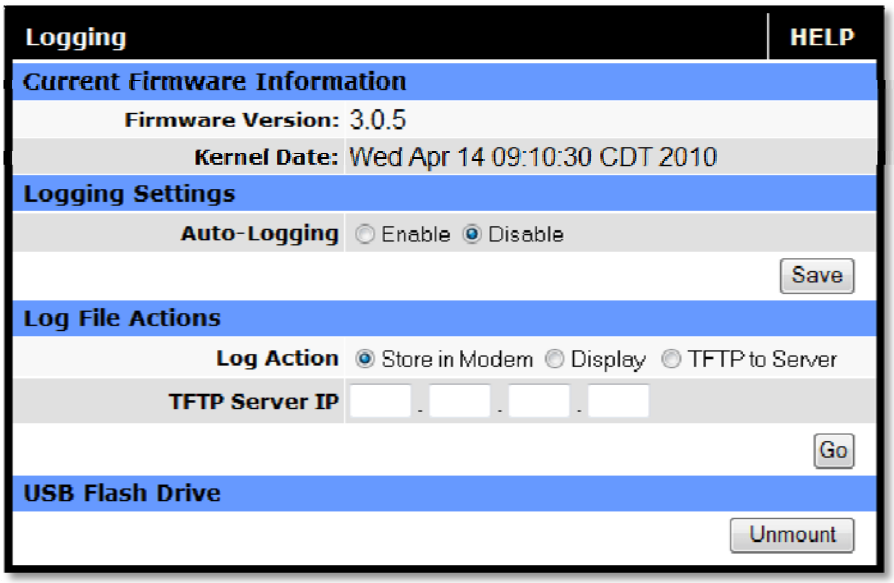
9 DIAGNOSTICS

Select Diagnostics from the left menu bar.

9.1 LOGGING

The Logging page provides a way to capture the current status log of the modem. Such a log may be useful to CalAmp Technical Services personnel to help resolve operational problems.

Figure 24 Diagnostic Logging Page



9.1.1 CURRENT FIRMWARE INFORMATION

- **Version:**
  Displays the modem firmware version currently loaded in the unit.

- **Kernel Date:**
  Displays the date of the operating system kernel the unit is running.

9.1.2 LOGGING SETTINGS

- **Auto-Logging:**
  Selecting **Enable** and pressing Save will enable the logging capability which saves periodic and event driven logs to permanent memory. Technical Services personnel may find such logs useful in analyzing field issues. Selecting **Disable** and pressing Save will disable the logging capability. This is the default setting. To make best use of available memory it is recommended to only enable the logging capability if it is necessary to help diagnose an issue.

9.1.3 LOG FILE ACTIONS

- **Store in modem:**
  Selecting Store in Modem and pressing Go will create a current status log, and overwrite any previously saved log. This action will save a log even if auto-logging is disabled. It is best to save the log immediately following the adverse event, and before any reboot. This log will contain only information collected since the most recent reboot of the device.

- **Display:**
  Selecting Display and pressing Go will display a previously stored log directly to the web browser. You can use your mouse to select the text, copy it, and paste it into a text editor to save the log on your computer.

- **TFTP to Server:**
  Selecting TFTP to Server and pressing Go will initiate a transfer of a previously saved log file to a specified IP address using the TFTP protocol. In order for the transfer to be successful, a reachable IP address must be entered under TFTP Server IP and the computer at that IP address must be running a TFTP Server program. Many free TFTP Servers are available for download over the internet. Note that TFTP is different than FTP.

- **TFTP Server IP:**
  When selecting TFTP to Server and pressing Go a valid and reachable IP address must be entered here in order to complete the transfer of the saved log file using the TFTP protocol. In order for the transfer to be successful, a reachable IP address must be entered under TFTP Server IP and the computer at that IP address must be running a TFTP Server program. Many free TFTP Servers are available for download over the internet. Note that TFTP is different than FTP.

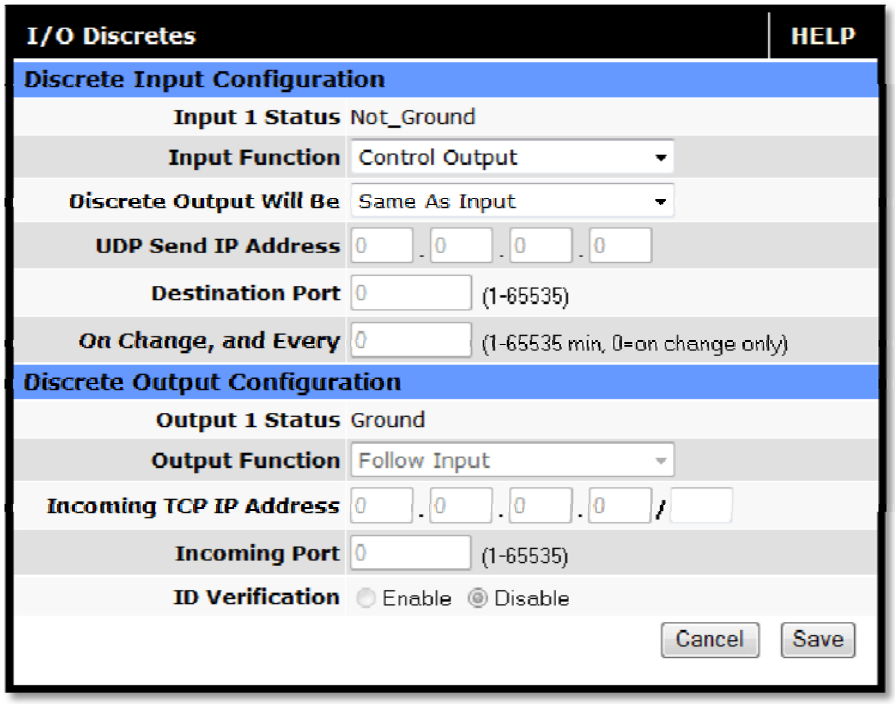
9.1.4 USB FLASH DRIVE

- **Unmount:**
  Remove a flash drive plugged into the USB port. This drive is mounted at /mnt/flash (for ODP use only).

10 I/O DISCRETES

The I/O Discretes screen is used to configure the I/O Discretes parameters to permit automated and/or remote monitoring and control of the I/O Discretes. Each modem is equipped with 1 input discrete and 1 output discrete interfaced to the top two pins on the 4 pin molex power connector. Refer to the users manual for diagram and electrical specifications.

Figure 25 I/O Discretes Configuration Page



10.1.1 DISCRETE INPUT CONFIGURATION

- **Input 1 Status:**
  This displays the status of the discrete input as sensed by the modem firmware.

- **Input Function:**
  This allows selection of the possible automated actions based on the input status.

  a) Reset Modem if Grnd – If the modem senses the input as “Ground”, the modem will be fully reset. This signal is debounced for approximately 1 second before action is taken. This setting is a “safe” choice without an external device, as the modem contains a pull-up resistor and the signal will be held to “Not Ground” if not driven by an external device.

  b) Reset Modem if Not Ground – If the modem senses the input as “Not Ground”, the modem will be fully reset. This signal is debounced for approximately 1 second before action is taken. This setting should only be used if a external device is used to normally drive this input to Ground. The modem will continuously reset if the external device is not present.

c) Control Output – This is the default setting. The discrete input can be used to control the discrete output. Refer to the next control (Output Will Be) for more information.

d) Send UDP Packet – The modem can be configured to send a UDP packet periodically and/or whenever the input status changes. The packet includes the modem ESN (or IMEI) and the current status of the input and the output.

- **Discrete Output Will Be:**
  This field is enabled only if "Control Output" is selected for Input Function.

  a) Same as Input – When selected, the output discrete will be driven by the modem to the same state as currently sensed for the input discrete. Debounce of the input discrete will delay a change in the output discrete by approximately 1 second.

  b) Opposite of Input - When selected, the output discrete will be driven by the modem to the opposite state as currently sensed for the input discrete. Debounce of the input discrete will delay a change in the output discrete by approximately 1 second.

- **UDP Send IP Address:**
  This field is enabled only if "Send UDP Packet" has been selected for "Input Function". Enter a visible IP address here to receive periodic and on change notifications of Discrete I/O status. The format of the notification is discussed below under "UDP Notification Format".

- **Destination Port:**
  This field is enabled only if "Send UDP Packet" has been selected for "Input Function". Enter the port number at the above IP Address that is ready to receive the notifications. Make sure the receiver's firewall is set appropriately to allow the UDP packet to reach the specified port.

- **On Change, and Every:**
  This field is enabled only if "Send UDP Packet" has been selected for "Input Function", or one of the options for "Send SMS" has been chosen. Enter the time in minutes for which a periodic status update is desired. If notification is only wanted when the input changes status, enter "0" in this field. Be aware that your carrier's text message rates may apply for each message initiated by the modem.

SMS options are only available on 882-GPRS and 882-EDGE modems.

- **Send SMS:**
  This field is enabled only if either "Send UDP Packet" or "Control Output" have been selected for "Input Function". Choose under what conditions a short (text) message to the specified destination MDN. A message can be sent when the input changes to "Ground", and/or when the input changes to "Not Ground". Be aware that your carrier's text message rates may apply for each message initiated by the modem.

- **SMS Destination MDN:**
  This field is enabled only if a "Send SMS" option has been checked. Specify the 10 digit MDN an SMS message is to be sent to. Caution – Entering an incorrect MDN may cause a SMS to be undeliverable, or delivered to an unsuspecting party. Carrier charges may still apply to a wrongly addressed SMS.

- **SMS Text on Ground:**
  This field is enabled only if a “Send SMS” option has been checked. Enter a message of up to 64 characters to be sent in an SMS when the Input Discrete changes to “Ground”, and periodically (if the input is “Ground”) if the On Change, and Every field is not 0.

- **SMS Text on Not Ground:**
  This field is enabled only if a “Send SMS” option has been checked. Enter a message of up to 64 characters to be sent in an SMS when the Input Discrete changes to “Not Ground”, and periodically (if the input is “Not Ground”) if the On Change, and Every field is not 0.

- **UDP Notification Format:**
  The notification format has 4 fields. Each field is separated by a comma (,) and the message is terminated with a semicolon (;). The format is:

  — I/O Update, ID:<ESN or IMEI>, Input 1:<value>, Output 1:<value>;
  — I/O Update – the ASCII characters I/O Update (space between O and U)
  — ID:<ESN or IMEI> - the ASCII characters ID: followed by the cell module ESN or IMEI. For example – ID:608AE977
  — Input 1:<value> - the ASCII characters Input 1: (space between t and 1) followed by the value Ground, or Not_Ground
  — Output 1:<value> - the ASCII characters Output 1: (space between t and 1) followed by the value Ground, or Not_Ground

- **Full Example:**
  I/O Update, ID:608AE977, Input 1:Ground, Output 1:Not_Ground;

10.1.2 DISCRETE OUTPUT CONFIGURATION

- **Output 1 Status:**
  This displays the status of the discrete input as driven by the modem firmware. The modem will drive the output to Ground when directed. A pull-up resistor is required on the connected device in order to ensure the connected device senses a “high” when the modem is set to provide the “Not_Ground” setting.

- **Output Function:**
  a) Ground if PPP UP – When chosen, the modem will drive the output to “Ground” when the PPP connection is UP. If PPP is DOWN, the Not_Ground setting will be output.

  b) Not Ground if PPP UP – When chosen, the modem will drive the output to “Ground” when the PPP connection is DOWN. If PPP is UP, the Not_Ground setting will be output.

  c) Follow Input – This is merely a status setting – it cannot be selected directly. This setting is assigned (and disabled) when “Input Function” is set to “Control Output”.

d) Receive TCP Packet – When chosen, the output can be controlled via the reception of a TCP packet in the format described below. Valid packets are acknowledged by a return TCP packet with text formatted as described in the Discrete Input Configuration Section.

e) Receive SMS – The "Receive SMS" option is only available on 882-GPRS and 882-EDGE modems. When chosen, the output can be controlled via the reception of short (text) messages containing the characters specified in the fields "SMS Text For (and Not) Ground". Be aware that your carrier's text message rates may apply for each message received by the modem. The carrier delivers SMS to the modem even when this choice is not active. This can cause its mailbox to fill up with unread messages. When this choice is enabled, the modem periodically deletes SMS messages to make room for new ones. As a result, when enabling Receive SMS, the mailbox may be full. Within a few minutes any existing messages will be processed and deleted.

f) Set To Ground – This will set the output to "Ground" immediately. This disables automated control of the output (settings a-e).

g) Set To Not Ground – This will set the output to "Not Ground" immediately. This disables automated control of the output (settings a-e).

- **Incoming TCP IP Address:**
  This field is enabled only if "Receive TCP Packet" has been selected for "Output Function". If desired, enter a specific IP address (with subnet mask if desired) from which all valid requests must originate. Leave the subnet mask field blank to match only the IP address specified. If the IP address varies, or there is no desire to validate the source, enter 0.0.0.0, which will cause the modem to accept the connection from any IP address.

- **Incoming Port:**
  This field is enabled only if "Receive TCP Packet" has been selected for "Output Function"; Enter the destination port number specified by the IP Address that will be sending the TCP data. This field is mandatory for use with "Receive TCP Packet".

- **ID Verification:**
  This field is enabled only if "Receive TCP Packet" has been selected for "Output Function"; When Enabled, a received TCP packet will be scanned to ensure it contains the ESN (or IMEI) of the modem before the requested output setting is applied. This check is not performed if the setting is disabled.

SMS options are only available on 882-GPRS and 882-EDGE modems.

- **SMS Text For Ground:**
  This field is enabled only if "Receive SMS" has been chosen for "Output Function". Enter up to 12 characters that must appear in an incoming SMS message to set the Output Discrete to "Ground". The characters specified must appear in that exact order somewhere within the received message to trigger the output discrete.

- **SMS Text for Not Ground:**
  This field is enabled only if "Receive SMS" has been chosen for "Output Function". Enter up to 12 characters that must appear in an incoming SMS message to set the Output Discrete to "Not Ground". The characters specified must appear in that exact order somewhere within the received message to trigger the output discrete.

- **TCP Control Packet Format:**
  The control packet format has 3 fields. Each field is separated by a comma (,) and the message is terminated with a semicolon (;). The format is:

  — I/O Update, ID:<ESN or IMEI>, Output 1:<value>;
  — I/O Update – the ASCII characters I/O Update (space between O and U)
  — ID:<ESN or IMEI> - the ASCII characters ID: followed by the cell module ESN or IMEI. For example – ID:608AE977. The <ESN or IMEI> is not required if ID verification is disabled. However, a minimum of "ID:," is required with ID verification disabled.
  — Output 1:<value> - the ASCII characters Output 1: (space between t and 1) followed by the value Ground, or Not_Ground

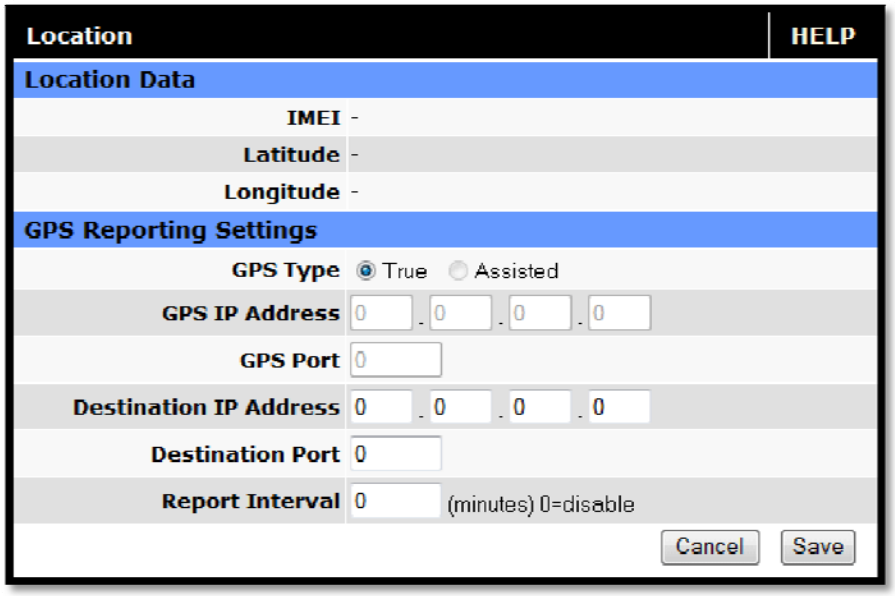
- **Full Example:**
  I/O Update, ID:608AE977, Output 1:Not_Ground;

  This is acceptable if ID verification is disabled:
  I/O Update, ID:, Output 1:Ground;

11 LOCATION

The Location page displays the ESN or IMEI as applicable, latitude, and longitude associated with the LandCell. It also allows for configuration of the GPS fix type, a remote destination to send data, and an interval defining how often to send that data.

Figure 26 Location Configuration Page



11.1.1 LOCATION DATA

- **ESN:**
  The Electronic Serial Number (see Provisioning page for more details).

- **Latitude:**
  The last reported latitude of the LandCell in degrees/minutes/seconds.

- **Longitude:**
  The last reported longitude of the LandCell in degrees/minutes/seconds.

11.1.2 GPS REPORTING SETTINGS

- **GPS Type:**
  Sets the GPS fix type. If True GPS is used, the cell module determines the GPS coordinates by itself. If available, Assisted GPS can be selected. The cell module will use a Position Determination Entity located at the GPS IP Address and Port to determine its location.

- **GPS IP Address:**
  Sets the IP address used in Assisted GPS.

- **GPS Port:**
  Sets the port number used in Assisted GPS.

- **Destination IP Address:**
  Sets the IP address to which UDP packets are sent with the GPS information.

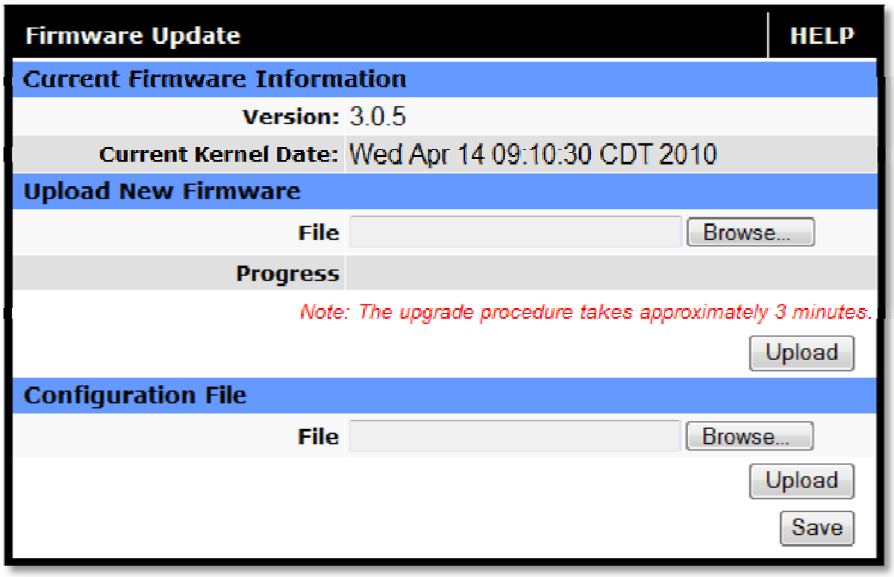
- **Destination Port:**
  Sets the port to which the GPS information is sent.

- **Report Interval:**
  Sets how often GPS information is reported. Setting to 0 disables sending of GPS information to Destination IP and Port.

12 FIRMWARE UPDATE

Select **Firmware Update** from the left navigation page to open the firmware update page. When newer versions of the modem firmware become available, the user can download the proper file from the CalAmp web site and manually update the unit.

Figure 27 Firmware Update Page



12.1.1 CURRENT FIRMWARE INFORMATION

- **Version:**
  Displays the modem firmware version currently loaded in the unit.

- **Kernel Date:**
  Displays the date of the operating system kernel the unit is running

12.1.2 UPLOAD NEW FIRMWARE

- **File:**
  Enter the name of the update file for your device model. Alternatively, you may browse to the file location. The update can be done remotely if Remote Administration is enabled.

  The update file names are:

  - upgradegprs.tar.gz for the 822-GPRS modem.
  - upgradeedge.tar.gz for the 822-EDGE modem.
  - upgradehsdp.tar.gz for the 882-HSDP modem.
  - upgradehspa.tar.gz for the 882-HSPA modem.

- **Progress:**
  Displays the update progress after the Save button has been pressed.

After selecting the firmware upgrade filename above, press the **Upload** button to begin the firmware upgrade process.

12.1.3 CONFIGURATION FILE

- **File:**
  Field to input the uploaded configuration file to the modem. The Browse button can be used to locate the file in a specific folder. The file to be uploaded must be named config.xml. If multiple files need to be maintained, it is recommended that separate directories be used. The update can be done remotely if Remote Administration is enabled.

After selecting the firmware configuration filename above, press the **Upload** button to begin the configuration loading process.

- **Save:**
  Returns a link to the configuration file on the unit. Right-click the link and select "Save Target As..." to save the file. The link page refreshes after 15 seconds. It is recommended to use the specified filename to save the file. If multiple files need to be maintained, it is recommended to use directory paths to separate the files.

13 PRODUCT SPECIFICATIONS

Product specifications are subject to change without notice.

13.1 GENERAL SPECIFICATIONS

Interface Connectors	RS-232 DE-9S Connector (DCE) 10/100 Base-T Full Duplex USB Host Controller Power Connector I/O	
Power Connector	Molex Micro-Fit, 4 pin, PN:43045-0400	
LED Indicators	SVC-TYPE, TX/RX, DCD, RSSI	
Antenna Interface	SMA female	
Size	5.60 x 3.11 x 1.71 in.	
Weight	9.0 oz.	
Power Input	9.0 – 28VDC 1.8 W; 150 mA @ 12 VDC (average idle) 9.0 – 28VDC 4.7 W; 390 mA @ 12 VDC (peak active 882-GPRS) 9.0 – 28VDC 7.5 W; 625 mA @ 12 VDC (peak active 882-EDGE) 9.0 – 28VDC 7.0 W; 590 mA @ 12 VDC (peak active 882-HSPA)	
Input Pin	Drive with open collector or open drain, internal 18k ohm pull up to 3.3VDC	
Output Pin	Open collector with series 0 ohm resistor as fuse.	
Maximum TX Power	GSM: +33 dBm min. / +30 dBm min (1900MHz)	
Rx Sensitivity	GSM: > -108 dBm typical, -102 dBm min	
Frequencies	Cellular: TX: 824-849 MHz; Rx: 869-894 MHz PCS: TX: 1850-1910 MHz; Rx: 1930-1990 MHz	
Temperature	Operating: -30°C to +75°C (-22° to 167°F); Storage: -40°C to +85°C (-40° to 185°F) Note: RF performance of the cell module may be limited above 60°C.	
Emissions	FCC Part 15B	
Transport Protocols	UDP/TCP	
Command Protocol	Web interface, Command line v.250 AT, & proprietary	
Certifications	882-GPRS	PTCRB Approved, Various Carrier Approvals FCC ID: QIP-TC65, Industry Canada ID: IC: 267W-TC65 CE Approved, RoHS Compliant
	882-EDGE	PTCRB Approved, Various Carrier Approvals FCC ID: QIP-MC75i, Industry Canada ID: 7830A-MC75i CE Approved, RoHS Compliant
	882-HSPA	PTCRB Approved, Various Carrier Approvals FCC ID: N7N-MC8781, Industry Canada ID: 2417C-MC8781 CE Approved, RoHS Compliant

NOTE: Power consumption while transmitting is dependent on the TX power level of the cellular module. The TX power level of the module is controlled by the cellular base station.

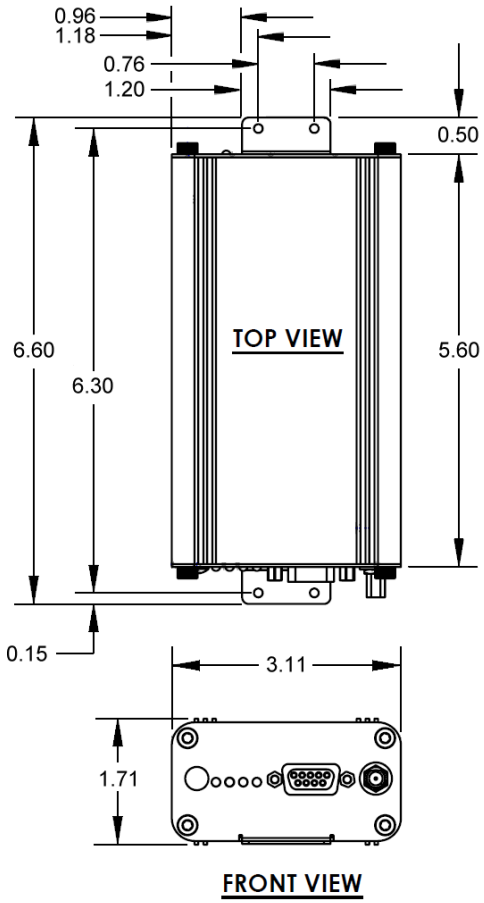
USL, CNL – Information Technology Equipment for use in Hazardous Locations, Class I, Div 2, Groups A, B, C, D, using Class 2 Power Supply. See Table 7 below for UL Ratings.

Table 7 – UL Ratings

Model	Description	Ratings	Maximum Rated Ambient Temperature	Operating Temperature Code
882-GPRS	GSM Data Modem/Router	9-28 VDC, 15W @ 12VDC Class 2	50°C	T6
882-EDGE	GSM Data Modem/Router	9-28 VDC, 15W @ 12VDC Class 2	50°C	T6
882-HSPA	GSM Data Modem/Router	9-28 VDC, 15W @ 12VDC Class 2	50°C	T4A

13.2 MECHANICAL SPECIFICATIONS

The following section describes in detail the exterior dimensions of the 882 GSM Series modems and how to utilize the mounting flanges to secure the modem to any surface, which can be drilled for such a purpose. The drawings may be used as layout reference, but it is advised that a physical comparison be made to the modem before proceeding with the mounting process.



14 ABBREVIATIONS

Abbreviation	Description
APN	Access Point Name
CSD	Circuit Switched Data
CTS	Clear to Send
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DTE	Data Terminal Equipment
IMEI	International Mobile Equipment Identity
EDGE	Enhanced Data rates for Global Evolution
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile communication
HSDPA	High-Speed Downlink Packet Access
LED	Light Emitting Diode
ME	Mobile Equipment
MS	Mobile Station
OTA	Over the Air
PDP	Packet Data Protocol
PPP	Point-to-Point Protocol
PPTP	Point-to-Point Tunneling Protocol
PRL	Preferred Roaming List
RSSI	Receive Signal Strength Indication
Rx	Receive
Tx	Transmit

15 SERVICE AND SUPPORT

Product Warranty, RMA and Contact Information

CalAmp guarantees that every 882 GSM Series Cellular Modem will be free from physical defects in material and workmanship for one (1) year from the date of purchase when used within the limits set forth in the Specifications section of this manual.

The manufacturer's warranty statement is available in Appendix 1. If the product proves defective during the warranty period, contact CalAmp Customer Service to obtain a Return Material Authorization (RMA).

RMA Request/Contact Customer Service

CalAmp
299 Johnson Avenue, Suite 110
Waseca, MN 56093
Tel: 507-833-8819 ext. 6707
Fax: 507-833-6748

BE SURE TO HAVE THE EQUIPMENT MODEL AND SERIAL NUMBER, AND BILLING AND SHIPPING ADDRESSES ON HAND WHEN CALLING.

When returning a product, mark the RMA clearly on the outside of the package. Include a complete description of the problem and the name and telephone number of a contact person. RETURN REQUESTS WILL NOT BE PROCESSED WITHOUT THIS INFORMATION.

For units in warranty, customers are responsible for shipping charges to CalAmp. For units returned out of warranty, customers are responsible for all shipping charges. Return shipping instructions are the responsibility of the customer.

Product Documentation

CalAmp reserves the right to update its products, software, or documentation without obligation to notify any individual or entity. Product updates may result in differences between the information provided in this manual and the product shipped. For the most current product documentation, visit www.calamp.com for datasheets, programming software and user manuals.

Technical Support

CalAmp
299 Johnson Avenue, Suite 110
Waseca, MN 56093
Tel: 507-833-8819
E-mail: wngsupport@calamp.com

APPENDIX A – WARRANTY STATEMENT

CalAmp warrants to the original purchaser for use ("Buyer") that data telemetry products manufactured by Dataradio ("Products") are free from defects in material and workmanship and will conform to published technical specifications for a period of, except as noted below, one (1) year from the date of shipment to Buyer. CalAmp makes no warranty with respect to any equipment not manufactured by Dataradio, and any such equipment shall carry the original equipment manufacturer's warranty only. CalAmp further makes no warranty as to and specifically disclaims liability for, availability, range, coverage, grade of service or operation of the repeater system provided by the carrier or repeater operator. Any return shipping charges for third party equipment to their respective repair facilities are chargeable and will be passed on to the Buyer.

If any Product fails to meet the warranty set forth above during the applicable warranty period and is returned to a location designated by CalAmp. CalAmp, at its option, shall either repair or replace such defective Product, directly or through an authorized service agent, within thirty (30) days of receipt of same. No Products may be returned without prior authorization from CalAmp. Any repaired or replaced Products shall be warranted for the remainder of the original warranty period. Buyer shall pay all shipping charges, handling charges, fees and duties for returning defective Products to CalAmp or authorized service agent. CalAmp will pay the return shipping charges if the Product is repaired or replaced under warranty, exclusive of fees and duties. Repair or replacement of defective Products as set forth in this paragraph fulfills any and all warranty obligations on the part of CalAmp.

This warranty is void and DRL shall not be obligated to replace or repair any Products if (i) the Product has been used in other than its normal and customary manner; (ii) the Product has been subject to misuse, accident, neglect or damage or has been used other than with CalAmp approved accessories and equipment; (iii) unauthorized alteration or repairs have been made or unapproved parts have been used in or with the Product; or (iv) Buyer failed to notify CalAmp or authorized service agent of the defect during the applicable warranty period. DRL is the final arbiter of such claims.

THE AFORESAID WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. DRL AND BUYER AGREE THAT BUYER'S EXCLUSIVE REMEDY FOR ANY BREACH OF ANY OF SAID WARRANTIES IT AS SET FORTH ABOVE. BUYER AGREES THAT IN NO EVENT SHALL DRL BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES WHETHER ON THE BASIS OF NEGLIGENCE, STRICT LIABILITY OR OTHERWISE. The purpose of the exclusive remedies set forth above shall be to provide Buyer with repair or replacement of non-complying Products in the manner provided above. These exclusive remedies shall not be deemed to have failed of their essential purpose so long as DRL is willing and able to repair or replace non-complying Products in the manner set forth above.

This warranty applies to all Products sold worldwide. Some states do not allow limitations on implied warranties so the above limitations may not be applicable. You may also have other rights, which vary from state to state.

EXCEPTIONS

THIRTY DAY:	Tuning and adjustment of telemetry radios
NO WARRANTY:	Fuses, lamps and other expendable parts

APPENDIX 2 – CE DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY FOR CE MARKING

Company contact details
Calamp Wireless Datacom, 299 Johnson Avenue, Suite 110,
Waseca, MN 56093-0833, USA

Phone: (507) 833-8819

Fax: (507) 833-6748

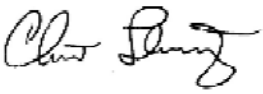
Calamp Wireless Datacom declares that their:
Cellular Data Modems
Model numbers:
819-GPRS-GEN, 822-GPRS-GEN, 822-EDGE-GEN, 882-HSDP-GEN.

are classified within the following EU Directives:
EU Directive 2006/95/EC Low Voltage
EU Directive 89/336/EEC & 2004/108/EC EMC
EU Directive 1999/5/EC R&TTE

and further conform with the following EU Harmonized Standards:
EN 60950-1:2006
EN 55024:1998+A2:2003
EN 55022:2006+A1:2007

Position of signatory: Director of Engineering

Name of Signatory: Chris Ludewig

Signed: 

Dated: 5/8/08