



LandCell™ 819-1XRT Modem

819-1XRT-XXX
CDMA 1xRTT Serial Cellular Data Modem

Quick Start Guide
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This Quick Start covers the operation of the LandCell™ 819-1XRT CDMA Cellular Data Modems. Specifications described are typical only and are subject to normal manufacturing and service tolerances.

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TECHNICAL SUPPORT

Our technical support staff is available Monday through Friday from 7:30 AM to 4:30 PM CDT via telephone at 507.833.8819; fax 507.833.6758 or email supportIMC@calamp.com.

Visit www.calamp.com to download product documentation and software drivers.

GENERAL

This guide details quick activation of the LandCell™ 819-1XRT modem. The following modem setup examples apply for Windows 98, Me, NT, 2000 & XP®. Due to the divergent graphical interfaces of these different operating systems, there may or may not be an extra step to follow (e.g. an additional procedure to open a program from the Start Menu). This guide is optimized for Windows XP Professional. The 819-1XRT is available for CDMA cellular networks. Please refer to the respective manual for further details.

MODEM USE

The LandCell™ 819-1XRT cellular modem is 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. The 819-1XRT would be routinely relocated in a mobile application. Please keep the cellular antenna of the 819-1XRT at a safe distance from your head and body while the modem is in use (see below).

IMPORTANT NOTICE

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.

MOBILE APPLICATION SAFETY

- Do not operate the LandCell™ 819-1XRT modems 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 modem. We recommend installation by a professional

INTERFERENCE ISSUES

Avoid possible radio frequency (RF) interference by following the following 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

PACKAGE CONTENTS

- One (1) 819-1XRT Cellular Modem
- One (1) Product Documentation Card

USER SUPPLIED CONTENTS

- A user-provided PC running MS Windows
- An antenna
- A 9-28 VDC @ 18W (12 VDC, 1.5A) Power Supply
- An interface cable

LANDCELL PRODUCTS AND ACCESSORIES

PRODUCT	DESCRIPTION	CATALOG NO.
819-1XRT	CDMA 1xRTT Data Modem	819-1XRT-XXX*
Antenna	4" Antenna 3" Mag Mount Antenna	L2-ANT0001 L2-ANT0003
Power Supply	110 VAC input DC Power Cable	L2-PWR0001 L2-PWR0002
Interface Cables	Serial Cable	L2-CAB0002
AGPS Option	Installed AGPS antenna connector	823-7500-501

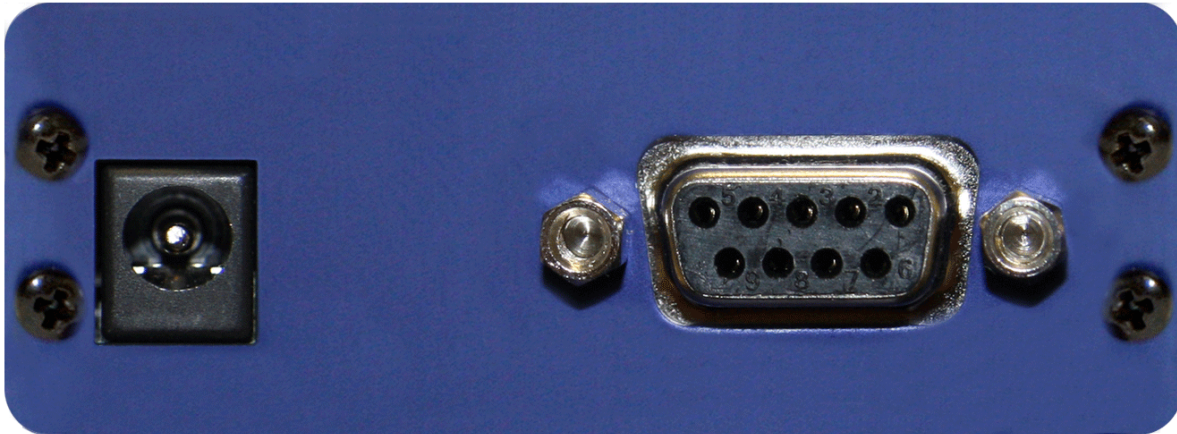
*XXX-carrier identifier

**FRONT PANEL LED INDICATORS**

PWR	Green	Power LED
TX	Red	Transmit/Receive
DCD	Amber	Carrier Detect
RX	Green	Received Signal Strength Indicator (RSSI)

FRONT PANEL CONNECTIONS

RF	Female SMA
AGPS	Female SMA (optional)

**BACK PANEL CONNECTIONS**

Power Jack	2.1x5.5mm DC barrel (Center Positive)
RS-232	Serial Port, Standard DE-9 female

SETTING UP THE 819-1XRT MODEM USING THE 819-1XRT CDMA DRIVER:

You may download all necessary modem driver files from our website at www.calamp.com. If you are installing the modem using the drivers from the website, refer to the steps listed in the 819-1XRT User Manual.

SETTING UP THE 819-1XRT USING NATIVE WINDOWS DRIVERS:

1. Go to the Control Panel and select **Phone and Modem Options**.
2. Select the **Modem Tab**. Select **Add...** and follow the Wizard. Check **Don't Detect My Modem**.
3. Select **Standard 19200 bps Modem**. Click **Next**.
4. Assign the modem to the COM connected to modem. Click **Next**.
5. Click **Finish**.

CONFIGURING THE MODEM

1. Click on Start → Settings → Control Panel. Select **Phone and Modem Options**.
2. Click **New**.
3. In **Location Name**, enter a name to distinguish this connection (i.e., 819-1XRT). Type your area code in the **Area Code** box.
4. Click **Apply** and **OK**. The window should exit out to the **Phone and Modem Options** box.
5. Click the tab at the top titled **Modems**. Select the **Standard 19200 bps Modem** (or the **Kyocera High-Speed Modem** if you installed using the driver from the website) and click **Properties**.
6. Click the **Modem Tab** at the top of this new box. The box titled **Maximum Port Speed** should read: 115200. If not, scroll down to **Select 115200**. Click **OK**. Click **Apply**. Click **OK**.

OPERATIONAL STATES

The modem has three operational states:

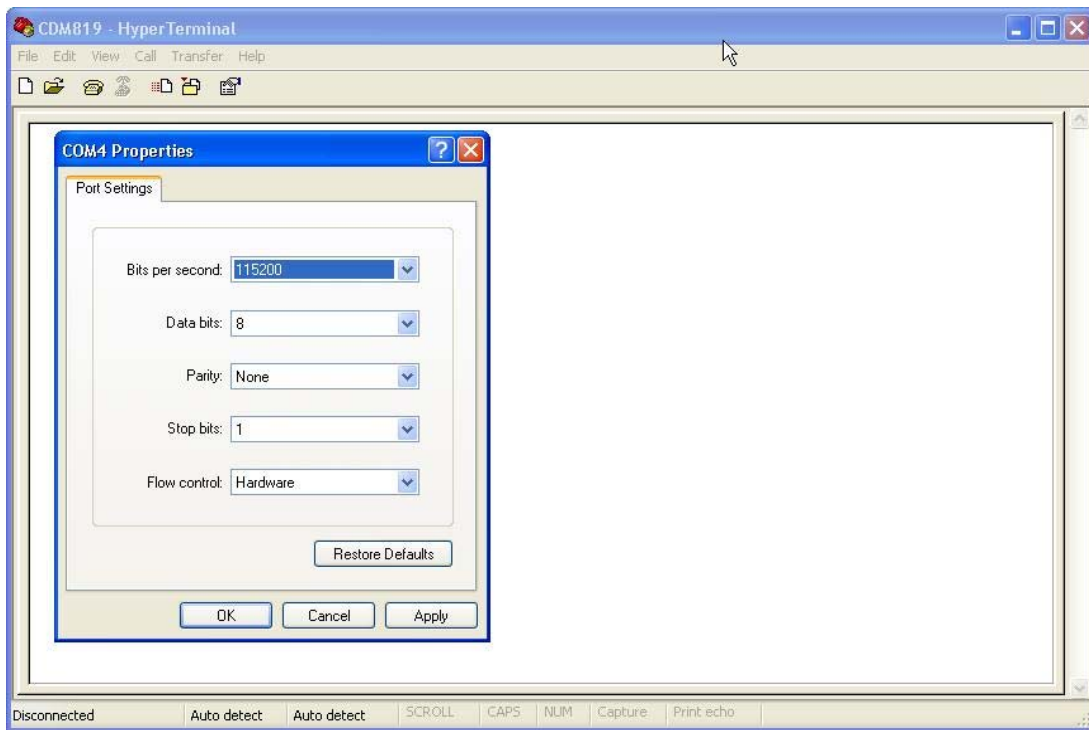
- Command State
- Online State
- Online Command State

When first powered on, the modem is in the Command State where it is able to accept AT commands. When instructed to dial out or to answer a data call, the phone is in the Online State.

ACTIVATING YOUR MODEM

1. Connect the modem to an active COM port on a PC with an RS-232 9 pin straight through cable.
2. Attach the antenna and power connector.
3. Connect with a Hyper-Terminal session set to 115,200, 8 Bits, No Parity, 1 Stop Bit, and Hardware Flow Control enabled. Refer to Figure 1.

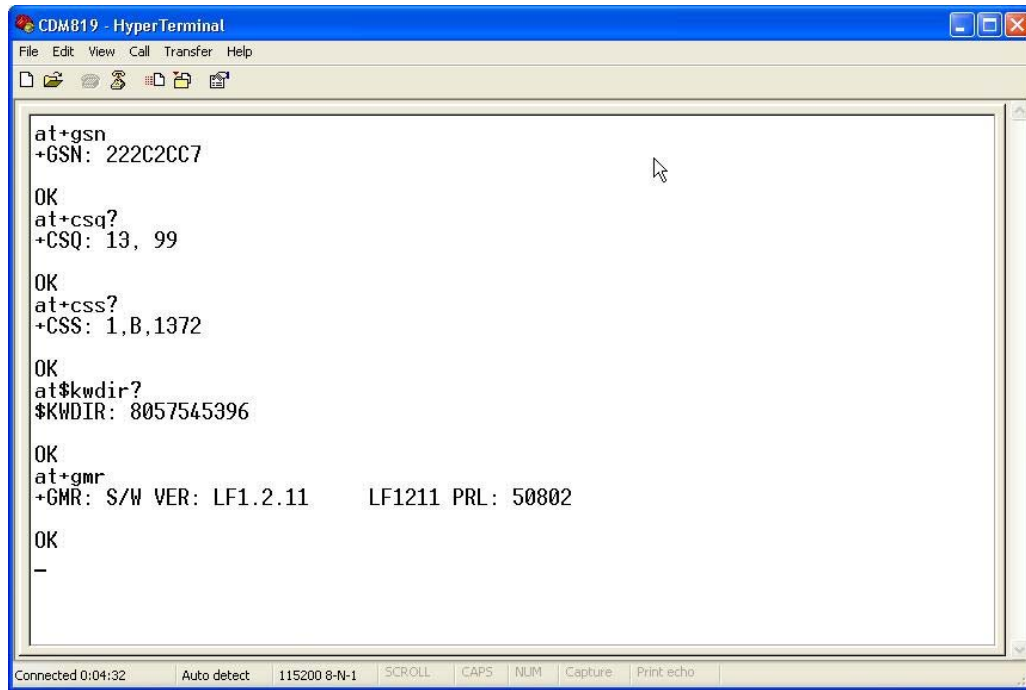
Figure 1: 819-1XRT HyperTerminal Port Settings



4. Confirm contact with the modem with **AT+GSN**. This prints out the ESN of the modem i.e. (+GSN: 45262036). If you get an Error or no communication message, verify the modem is connected to the proper COM port and powered on. See Figure 2.
5. Verify good signal strength with **AT+CSQ?**. A typical reply is +CSQ? 19,99. Signal strength ranges from 0 to 31, the higher the number the stronger the signal.
6. Confirm your registration on the cellular network with **AT+CSS?**. A reply of **+CSS? 2,Z,99999** indicates you are not registered. It may take up to 15 seconds after power-up to register on the network. Once registered, a typical response is **+CSS?: 1,A,4152** where 1 is the band class, 1=800 MHz, 2=1900 MHz, A-F is the band (Z indicates you are not registered on network), 4152 is the SID, i.e. the cell tower ID, (99999 indicates you are not registered on network).
7. Confirm the phone number currently in the modem with **AT\$KWDIR?**. It should be 10 digits (i.e. 0000005555) prior to activation.
8. Perform the activation instructions specific to your carrier as indicated in Appendix 1: Subscriber Activation, (i.e., for Verizon, OTASP can be initiated with an AT command of **AT+CDV*22899**). Wait 2 minutes.
9. After the unit has been activated, verify programming success with **AT\$KWDIR?**. It should now display your assigned number.

10. You can also confirm the assigned PRL number with **AT+GMR**. Power cycle the modem. If your account supports voice, you can confirm modem activation by performing a voice call to your cell phone with **AT+CDV<Cell Phone Number>** (use no spaces or angle brackets). Your cell phone should ring and display the phone number of the modem.

Figure 2: 819-1XRT HyperTerminal Modem Activation



```
CDM819 - HyperTerminal
File Edit View Call Transfer Help
[Icons]
at+gsn
+GSN: 222C2CC7
OK
at+csq?
+CSQ: 13, 99
OK
at+css?
+CSS: 1,B,1372
OK
at$kwdir?
$KWDIR: 8057545396
OK
at+gmr
+GMR: S/W VER: LF1.2.11    LF1211 PRL: 50802
OK
-
```

Connected 0:04:32 | Auto detect | 115200 8-N-1 | SCROLL | CAPS | NUM | Capture | Print echo

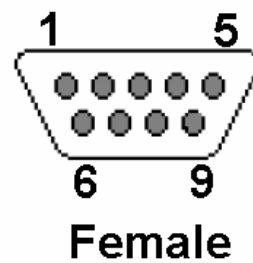
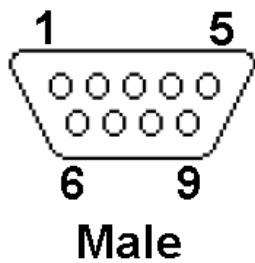
Configuration and test of a Circuit Switch Data (CSD) call, and Packet Data Call (TCP/IP) are discussed in the user manual.

STANDARD RS-232 DE-9 PINOUT

Table 1: DE-9 Pin Out Description (Direction is DTE relative to DCE)

Pin	Name	Direction	Description
1	CD	←	Carrier Detect
2	RX	←	Receive Data
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

Figure 3: RS-232, DB9 Pin out Diagrams



APPENDIX 1: SUBSCRIBER ACTIVATION

Verizon Wireless Subscribers

For Verizon Wireless subscribers residing in the United States, the standard provisioning procedure is by issuing the command **AT+CDV*22899**. If the modem will not provision and you have verified the serial number is activated with Verizon in their systems, manually key in the phone number. In cellular terminology, the Mobile Directory Number (MDN) number you call to connect to the modem is entered as described below. Enter these commands via your terminal emulation software:

- **AT+GMR** (Note the PRL Number)
- **AT\$KWMODE=1**
- **AT\$KWSPC=000000**
- **AT\$KWDIR=10-Digit MDN Phone Number From Verizon (Without Hyphens)**
- **AT\$KWMSID=10-Digit (MIN) Number From Cellular Carrier (Without Hyphens)**. This only needs to be entered if different than the MDN.
- **AT\$KWMODE=2**
- **AT+CDV*22899**

After issuing the last AT+CDV*22899 command, let the modem sit uninterrupted for four minutes. After four minutes, remove the power supply jack from the modem, wait several seconds and reinsert it. Reconnect via terminal emulation and query the unit with these commands:

- **AT\$KWMODE?** (returns online mode)
- **AT\$KWDIR?** (returns modem's phone number)
- **AT+GMR** (returns firmware version and PRL)

If the PRL is different than before, OTASP has definitely occurred.

Call your phone to test activation. When it rings, confirm the number matches, answer and hang-up to disconnect the call. (Do not enter the angle brackets, just the cell phone number without spaces.)

- **AT+CDV<Phone Number>**

Sprint PCS Subscribers

Sprint PCS uses IOTA (IP-based Over The Air) for their Over-the-Air provisioning system. IOTA uses packet data calls to transfer the configuration data to the phone. These IOTA data sessions can be network initiated or client initiated.

Network initiated IOTA is the preferred method. An automatic network initiated IOTA session occurs when the module first registers onto the Sprint network. This IOTA session is queued when Sprint originally sets up and 'activates' the account. In their current implementation, Sprint imposes a 72 hour expiration timer for this queued IOTA session.

An IOTA session has a device time-out of 15 minutes. If there is no success within 15 minutes, the status will change to fail and the module will stop trying. A normal IOTA session takes from 1 to 3 minutes. To register onto the network, the module needs a sufficient signal and must be manually provisioned with the MDN and MSID.

The IOTA session will occur and populate the 3GPD parameters. If it is the first IOTA session, it is called a Network Initiated Initial Provisioning (NIIP.)

NOTE: An IOTA session **MUST** occur while the device has a sufficient signal and is registered on the Sprint PCS Network. A session will not be successful if the device is out of coverage or not properly registered on the Sprint PCS network.

Use the following commands to program the modem.

- **AT\$KWMODE=1**
- **AT\$KWSPC=Unlock/Activation Code (6 or 7 digits supplied by Sprint)**
- **AT\$KWDIR=10-Digit (MDN) Directory Phone Number From Cellular Carrier (Without Hyphens)**
- **AT\$KWMSID=10-Digit (MIN) Number From Cellular Carrier (Without Hyphens) This only needs to be entered if different than the MDN.**
- **AT\$KWMODE=2**

Power off the modem for 15 seconds. Power on the modem. Wait 5 to 10 minutes for the device to register on the network.

Call your phone to test activation. When it rings, confirm the number matches, answer and hang-up to disconnect the call. (Do not enter the angle brackets, just the cell phone number without spaces.)

- **AT+CDV<Phone Number>**

Alltel Subscribers

Alltel uses both OTAPA and a manual process for provisioning modems. The OTAPA process for voice phones is not normally possible with a modem, so the manual process must be followed. The ESN is entered into their database and an MDN and MIN number are assigned to the account. The MDN is the number used to contact the modem. The MIN is an internal number used for cellular network routing. Most of the time these numbers are the same. It is very important to program these numbers correctly. If they are reversed, the modem will not work. The MIN is automatically loaded with the MDN number. Enter the MDN first.

- **AT\$KWMODE=1**
- **AT\$KWSPC=000000**
- **AT\$KWDIR=10-Digit (MDN) Directory Phone Number From Cellular Carrier (Without Hyphens)**
- **AT\$KWMSID=10-Digit (MIN) Number From Cellular Carrier (Without Hyphens) This only needs to be entered if different than the MDN.**
- **AT\$KWMODE=2**

Call your phone to test activation. When it rings, confirm the number matches, answer and hang-up to disconnect the call. (Do not enter the angle brackets, just the cell phone number without spaces.)

- **AT+CDV<Phone Number>**

Telus (Canada) Subscribers

The standard procedure to provision the modem is by issuing the command **AT+CDV*22803**. If the modem will not provision and you have verified with Telus the serial number is activated in their systems, manually key in the phone number. In cellular terminology, the number you call to connect to the modem is known as the Mobile Directory Number (MDN) and is entered as described below. Enter these commands via your terminal emulation software:

- **AT+GMR** (Note the PRL Number)
- **AT\$KWMODE=1**
- **AT\$KWSPC=000000**
- **AT\$KWDIR=10**-Digit MDN phone number from Telus (without hyphens)
- **AT\$KWMSID=10**-Digit (MSID/MIN) number from cellular carrier (without hyphens). This is required only if different than the MDN.
- **AT\$KWMODE=2**
- **AT+CDV*22803**

After issuing the last command listed above, let the modem sit uninterrupted for four minutes. After four minutes, remove the power supply jack from the modem. Wait for several seconds and reinsert it. Reconnect via terminal emulation and query the unit with these commands:

- **AT\$KWMODE?** (returns online mode)
- **AT\$KWDIR?** (returns modem's phone number)
- **AT+GMR** (returns firmware version and PRL)

If the PRL is different than before, OTASP has occurred.

Call your phone to test activation. When it rings, confirm the number matches, answer and hang-up to disconnect the call. (Do not enter the angle brackets, just the cell phone number without spaces.)

- **AT+CDV<Phone Number>**