
Proxicast

PocketPORT 2

3G/4G Cellular Modem Bridge

User Guide



Firmware Version 2.2


proxicast®

www.proxicast.com

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1. Introducing the Proxicast PocketPORT 2

1.1 What is the PocketPORT?

PocketPORT is the world's smallest 3G/4G Cellular Modem to Ethernet Bridge. The PocketPORT instantly connects virtually any cellular (3G/4G) USB modem to any Ethernet device simply by plugging both devices into the PocketPORT. Any device that can be connected to a cable, DSL or satellite modem, Ethernet switch or hub can use the PocketPORT to get Internet service via an inexpensive USB modem from cellular service providers. The PocketPORT is the highly portable, simple and low-cost alternative to large, complex and expensive cellular Ethernet modems.

Use a PocketPORT wherever wired Internet service is unavailable, difficult, costly or time-consuming to install. Plug a PocketPORT into the Ethernet port of devices such as IP cameras (web cams) for security applications, programmable logic controllers (PLC) for industrial processes, digital & network video recorders (DVR/NVR) or any other equipment that needs Internet service for remote access. Have field service technicians keep a PocketPORT in their "pocket" for instant Internet access for remote equipment when they are on site visits.



Figure 1: The PocketPORT 2

1.2 QuickStart – Automatic Configuration (default)

The PocketPORT 2 can automatically configure itself for dozens of popular 3G & 4G USB modems. By default, the PocketPORT 2 will attempt to configure any USB modem it detects on power-up.

Check the PocketPORT Support web site (<http://www.proxicast.com/PocketPORT>) for a list of auto configurable modems. Even if your USB modem is not listed, try Autoconfig first as many modem are similar and the PocketPORT 2 uses advanced heuristics to attempt to configure itself for unknown modems.

- Insert the USB modem into a PC and use the software on the modem or the CD to activate it and make a successful connection to your cellular service provider.
This step is REQUIRED !
- Configure the Ethernet device to automatically receive an IP address (DHCP)
- Connect the Ethernet device to the PocketPORT
- Insert the USB modem into the PocketPORT
- Power on the PocketPORT
- Wait 45-60 seconds for the Status LED to rapidly flash Blue

1.3 QuickStart – Manual Configuration

For modems which do not work in Autoconfig mode, or if any modem parameters must be over-ridden, follow these steps to manually configure the PocketPORT for your USB modem:

- Obtain an activated SIM card and the required APN, Username, and Password from your cellular provider
- Visit the PocketPORT Support web site (<http://www.proxicast.com/PocketPORT>) to obtain the necessary configuration settings for your USB modem
- Power on the PocketPORT & wait for the Status LED to slowly flash Red
- Press the Reset button for 2 seconds (Status LED = solid Red)
- Configure a PC to automatically receive an IP address (DHCP)
- Connect an Ethernet cable between the PC & PocketPORT
- Open the PC's web browser to: <http://192.168.1.1:8080>
- Enter the default username = **admin** and default password = **1234**
- Enter the required USB modem settings and your APN / username / password information
- Click **Generate Configuration**, then **Write Configuration**
- Connect the USB modem to the PocketPORT
- Wait 45-60 seconds for the Status LED to rapidly flash Blue

1.4 LEDs and Connectors



USB Jack	USB 3G/4G Cellular Modems (USB 2.0)
RJ45 Jack	10/100 Ethernet
Power Jack	5 VDC via micro USB (see specifications)
Status LED	PocketPORT Status:
Reset Button	Press for 2 seconds to enter Config Mode Press for 10 seconds to reset configuration to factory defaults

Figure 2: Connectors and Ports

	Slow Red	Offline		Solid Red	Configuration Mode
	Fast Red	Connecting		Red / Blue	Factory Reset
	Fast Blue	Online		Fast Violet	Firmware Upgrade

Figure 3: Status LED Patterns

1.5 Normal Boot-Up LED Sequence

The Status LED will go through the pattern shown below on power-up as a successful connection is made through the USB modem to the cellular network. Timing is approximate and will vary based on the modem used, cellular signal availability, auto-configuration versus manual configuration settings and other factors.

- Solid Red (10 seconds): Boot-up
- Slow Red Flash (30 seconds): Modem identification & configuration
- Fast Red Flash (15 seconds): Network connection & DDNS updates
- Fast Blue Flash: Online

1.6 Operating Modes

The PocketPORT has 4 distinct modes of operation:

1. IP Pass-Through / Bridge Mode (default)
2. NAT Router Mode
3. Virtual Cable Mode
4. Configuration Mode

When first powered on (or reset to factory defaults), the PocketPORT operates in **IP Pass-Through/Bridge Mode**. The IP address assigned to the USB modem by the cellular carrier is passed directly to the device attached to the PocketPORT's Ethernet port.

NAT Router Mode functions as a simple NAT router, allowing multiple devices to be connected to the PocketPORT (via an external switch or hub). The PocketPORT provides a DHCP server to assign private IP addresses to attached devices.

Virtual Cable Mode creates a fully encrypted point-to-point connection between two or more PocketPORT's. In this virtual private networking (VPN) mode, the devices connected to each of the PocketPORTs appear to be directly connected via an Ethernet cable.

Configuration Mode is entered by pressing the Reset button for 2 seconds. By accessing the PocketPORT's web GUI at <http://192.168.1.1:8080>, the default parameters such as the operating mode, IP address, dynamic DNS name, and modem-specific settings can be changed.

Please see the following sections for more information on each PocketPORT operating mode.

2. Configuration Mode

To change PocketPORT settings such as Operation Mode (IP Pass-Through, Router or Virtual Cable), IP & DHCP settings, Auto Ping (keep-alive), Dynamic DNS and modem-specific parameters:

- Press the Reset button for 2 seconds. The Status LED will turn solid red. The DHCP server will be enabled
- Access the PocketPORT's configuration page using a web browser at <http://192.168.1.1:8080>
Default Username = **admin** Default Password = **1234**

Device Status		
PocketPORT Model	PP-002	Cellular USB Modem to Ethernet Bridge/Router
Serial #	001B39110F4D	Ethernet MAC Address
Firmware Version	v2.2.9 (10/11/13)	PocketPORT software release
External IP address		IP address of the WAN interface
USB Modem Signal Quality	41% Graph	0=No Signal 1-32=Weak 33-65=Good 66-100=Strong
General Settings		
System Name	<input type="text" value="PocketPORT-001B39110F4D"/>	Descriptive name for this device
Connection Mode	IP Pass-Through Mode ▾	Select a connection mode
Reboot on Disconnect	No ▾	Reboot PocketPORT when the 3G/4G network connection drops
HTTP Config Port	<input type="text" value="8080"/>	HTTP port for configuration
HTTP Config Password	<input type="text" value="1234"/>	HTTP password for configuration
USB Modem Settings		
Attempt Autoconfig	Yes ▾	Detected: Novatel USB760 / MiFi 2200
USB Modem Type	Unknown ▾	Select the type of USB modem connected to the PocketPORT
USB Modem Port	ttyUSB0 ▾	Select the TTY port of USB modem connected to the PocketPORT
APN	<input type="text"/>	Enter your assigned APN (GSM/HSPA/LTE only)
APN Number	1 ▾	Select the APN context # to use (GSM/HSPA/LTE only)
Username	<input type="text"/>	Enter your Username (if required)
Password	<input type="text"/>	Enter your Password (if required)
SIM / R-UIM PIN	<input type="text"/>	Enter your SIM PIN (if required)

Figure 4: Configuration Screen – Part 1

2.1 Device Status

This section provides general information about the PocketPORT including the serial number, firmware version, current WAN IP address and cellular signal strength of the attached USB modem. If the signal strength is not displayed, configure the USB modem settings first and then restart the PocketPORT. Note that some USB modem models may not support signal strength display.

2.2 General Settings

In the General Settings section, you can define a descriptive System Name for the PocketPORT to help uniquely identify it (no spaces are allowed in the name). The General Settings section also configures the PocketPORT's Operating Mode (IP Pass-Through, NAT or Virtual Cable). The Reboot On Disconnect setting, while generally not necessary, causes the PocketPORT to restart every time the cellular connection is lost.

This section is where you can change the access password for the PocketPORT (username is fixed as "admin"). Further, you can change the Configuration Management Port number if the default value of 8080 conflicts with your application requirements.

2.3 USB Modem Settings

Automatic Configuration

The PocketPORT 2 has a built-in database of known modems and a set of advanced heuristics that can configure the PocketPORT for many common USB modems. Use the software provided by the modem manufacturer or network operator (either on the USB modem or on a CD) to test the USB modem on a Windows, Macintosh or Linux PC. Confirm that your cellular account was correctly provisioned and that you can make a connection to the cellular network for the type of service to which you subscribed (e.g. static IP). If you are unable to connect to the cellular network from a PC, please work with your cellular network operator to resolve any issues.

When Attempt Autoconfig is set to Yes, the PocketPORT will automatically set the necessary USB modem configuration for the modem that is detected. If for some reason the PocketPORT does not recognize your modem, or the default Autoconfig settings are not appropriate for your modem, set Attempt Autoconfig to No and enter the necessary settings (see below).

Manual Configuration

The general type of USB modem attached to the PocketPORT (CDMA or GSM) must be selected. In some instances, the USB port number that the USB modem uses must also be defined (refer to the USB Modem Configuration Guides on the PocketPORT Support website:

<http://www.proxicast.com//PocketPORT>).

For GSM modems, the Access Point Name (APN), username, password and PIN assigned to by the cellular service provider must also be entered. The correct values will depend upon the type of Internet service plan provisioned for the USB modem. Certain cellular modems may also require that the APN be selected from a list of profiles permanently stored in the modem. Unless the USB modem configuration guide indicates otherwise, leave the default APN Number as "1".

Some cellular networks require a Username and Password value (although most networks no longer use this security type). If not required, leave these fields blank. If you have not set a SIM/R-UIM PIN for your modem, leave this field blank.

2.4 NAT Router Mode Settings

Figure 5 shows the required values when the PocketPORT is operating in NAT Router Mode. These settings are not applicable to IP Pass-Through/Bridge or Virtual Cable Modes.

If necessary, you may change the PocketPORT's LAN IP address and DHCP Server settings to match those required for your application.

Note: Regardless of the NAT Router Mode IP Address setting, the PocketPORT's LAN IP address will always be 192.168.1.1 when in Configuration Mode.

When operating in NAT Router Mode, the PocketPORT can forward all "inbound" IP traffic from the Internet to a specific LAN IP address. Set this value when connecting to a device attached to the PocketPORT's Ethernet LAN segment from other remote Internet addresses. See Section 6 *Accessing Remote Devices* more information.

NAT Router Mode Settings		
LAN IP Address	<input type="text" value="192.168.1.1"/>	IP address for the PocketPORT's LAN port
LAN IP Subnet Mask	<input type="text" value="255.255.255.0"/>	Subnet mask for LAN
DHCP Pool Start Address	<input type="text" value="192.168.1.33"/>	Starting DHCP Server IP address
DHCP Pool End Address	<input type="text" value="192.168.1.161"/>	Ending DHCP Server IP address
Forward Inbound Traffic on All Ports to this IP Address	<input type="text"/>	IP address on LAN to receive inbound traffic (Virtual Host)
Auto Ping Settings		
Destination Address	<input type="text" value="8.8.8.8"/>	IP address to ping
Ping Frequency	<input type="text" value="5"/>	# of seconds between pings
Ping Failure Timeout	<input type="text" value="3"/>	# of seconds to wait for a reply
Failure Tolerance	<input type="text" value="3"/>	# of successive timeouts before failure
DynDNS Settings		
Hostname	<input type="text"/>	Enter your DynDNS Hostname, e.g. myhost.dyndns.com
Username	<input type="text"/>	Enter your DynDNS Username
Password	<input type="text"/>	Enter your DynDNS Password

Figure 5: Configuration Screen – Part 2

2.5 Auto Ping Settings

The PocketPORT monitors the USB modem's cellular connection and is able to detect many types of "dropped" connections. When a disconnection is detected, the PocketPORT automatically attempts to reestablish the connection.

The PocketPORT can also help keep the cellular connection "alive" by periodically sending an ICMP (ping) packet to a designated IP address. The Destination Address is the IP address or host name to ping. The default Destination Address is a Google DNS server (8.8.8.8). For IP Pass-Through, NAT Router or Virtual Cable modes, this should be a device on the Internet.

Ping frequency is the time between ping packets. Ping Failure Timeout is how long to wait for an ICMP Echo Reply before considering the packet to be lost. Ping Failure Tolerance is how many consecutive packet losses to allow before considering the connection to have failed.

Once the PocketPORT detects a cellular connection failure based on the Auto Ping settings, it will drop and restart the cellular connection or force the PocketPORT to reboot if the Reboot on Disconnect parameter is set to "Yes".

2.6 DynDNS Settings

Proxicast provides a unique permanent DNS name for every PocketPORT based on the device's serial number in the form of *serial#.pocketport.net*. This DNS name can be used to remotely access an Ethernet device attached to the PocketPORT, assuming your cellular account permits in-bound access to remote devices.

An additional user-defined DNS name can be created for each PocketPORT using the DynDNS.com service. Please visit www.dyndns.com for more information about setting up a DNS account and hostname. In the DynDNS Setting section of the PocketPORT configuration screen, enter the username, password and fully qualified DNS hostname as defined in your DynDNS account.

The *serial#.pocketport.net* and/or DynDNS hostnames will work whether the USB modem's cellular IP address is static or dynamic. The *serial#.pocketport.net* hostname is valid even if a DynDNS hostname

is also defined. See Section 6 *Accessing Remote Devices* for more information on using DNS names with cellular dynamic IP addresses.

Virtual Cable Settings (Virtual Cable Mode Only)		
Switchboard Server Address	<input type="text" value="vc.pocketport.net:9999"/>	Set to <i>vc.pocketport.net:9999</i> to use Proxicast's server
Account Name	<input type="text"/>	Enter your email address or another globally unique identifier
Network Name	<input type="text"/>	Enter a unique network name (same value on both PocketPORTs)
Network Password	<input type="text"/>	Enter an encryption key to secure your private network

Figure 6: Configuration Screen – Part 3

2.7 Virtual Cable Mode Settings

Figure 6 shows the settings required to use the PocketPORT's Virtual Cable Mode. A "switchboard" server must be defined that is used to help the ends of a virtual cable find each other on the Internet. Traffic is routed directly between endpoints whenever possible once the virtual cable connection is established.

Proxicast maintains a public virtual cable switchboard server (*vc.pockeport.net*) for use by our customers. All customer data and connections are encrypted and secured and the high-performance switchboard server has a 150 Mbps connection to the Internet. Customers connecting a large number of PocketPORTs to a single Virtual Cable network may wish to contact Proxicast regarding options for deploying their own virtual cable switchboard server.

We recommend using your email address as the Account name. This ensures that your PocketPORTs will be placed on the same virtual network and will be able to see each other.

Define a unique Network Name and Network Password (pre-shared key) for your virtual cable network. Two PocketPORTs will be able to reach each other only if the Account Name, Network Name and Network Password are the same on both devices. Use different Network Names to set up different virtual networks under the same account. Devices with different Networks Names are not visible to each other.

See Section 5. *Virtual Cable Mode* for examples of configuring various Virtual Cable Mode topologies.

2.8 Additional Configuration Settings

The Additional Configuration Settings field (Figure 7) can be used to save any advanced configuration parameters which are required for a specific USB modem, or to adapt the PocketPORT for a specific application. Settings entered into the Additional Configuration Settings field are saved as part of the PocketPORT's overall configuration. Refer to the [PocketPORT Command Reference](#) for a list of available configuration parameters and values.

2.9 Saving PocketPORT Settings

After making any setting changes click the **Generate Configuration** and **Write Configuration** buttons to save any changes to the PocketPORT. You may also enter other configuration parameters into the **Generated Settings** window based on modem-specific documentation or instructions from Proxicast.

After pressing the **Write Configuration** button, the PocketPORT will restart with the new setting values.

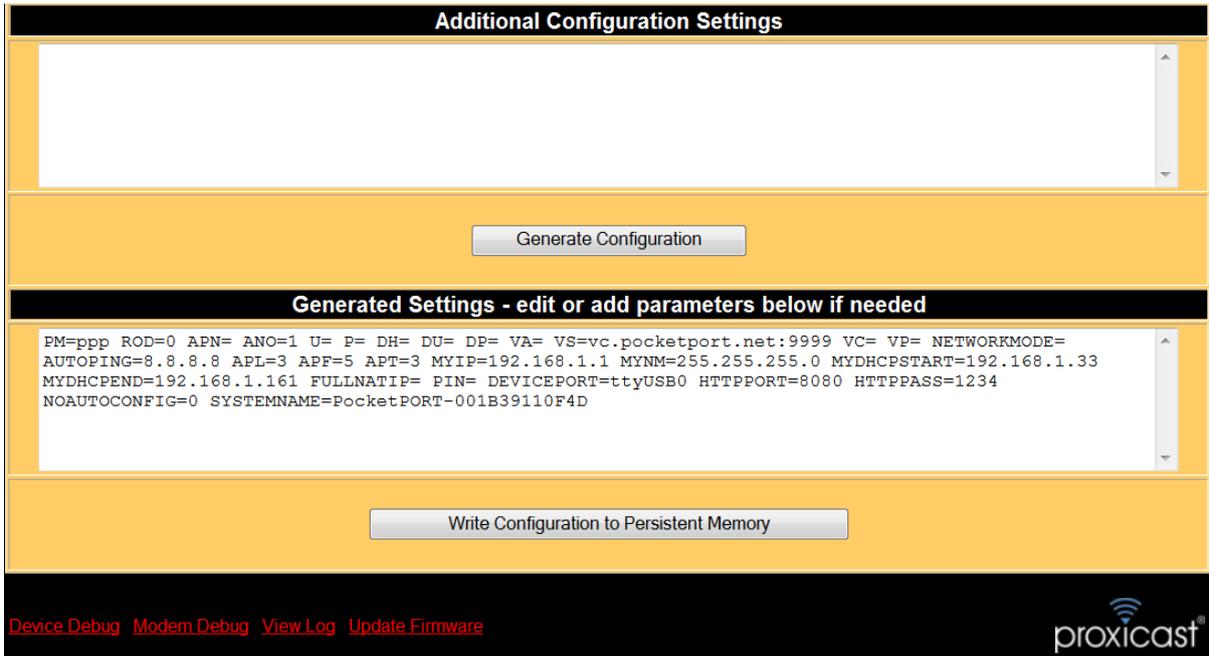


Figure 7: Generated Configuration Settings

2.10 Signal Strength History Graph

The Signal Strength History Graph (Figure 8) displays the modem's signal strength percentage over the past 2 minutes with readings taken approximately every 5 seconds. The color bands correspond to Weak, Good, and Strong signals. In general, reliable connection (and best throughput performance) is achieved when the signal remains in the Strong or Good zones. Some fluctuation is normal.

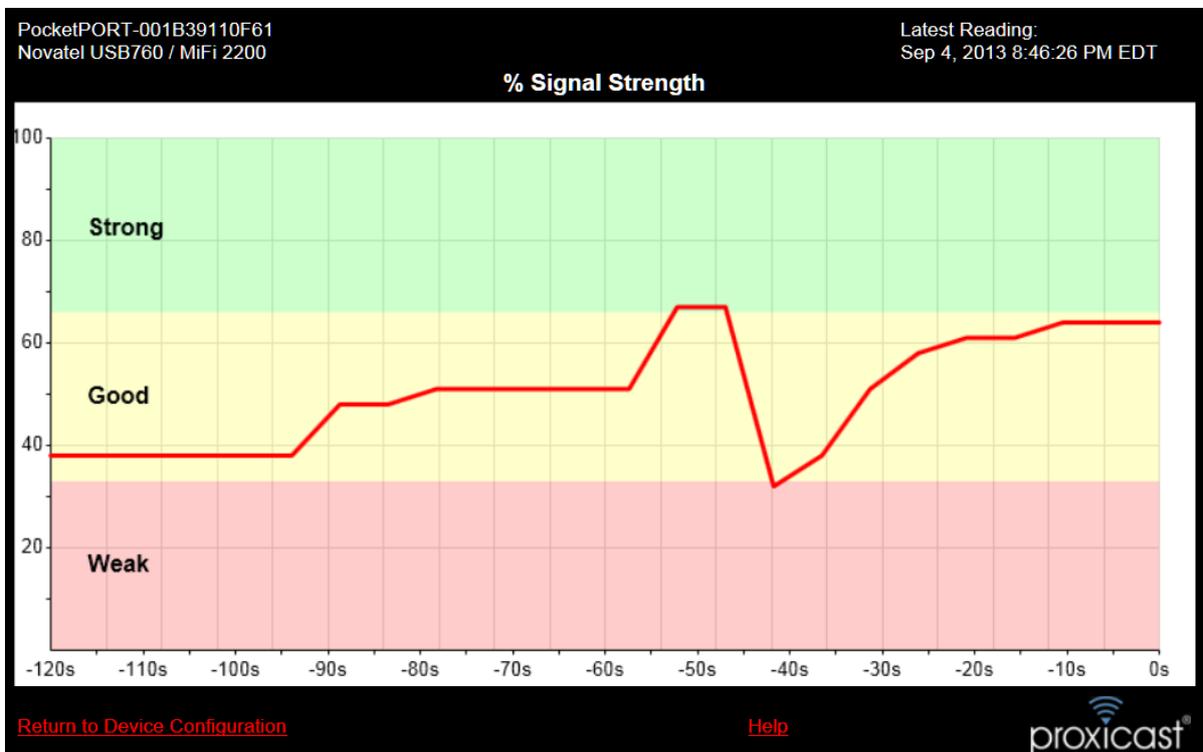


Figure 8: Signal Strength History Graph

Maximizing Signal Strength

- Place the antenna outside or near a window and as high as possible.
- Avoid interference sources such as metal enclosures, lighting fixtures, machinery, and computer/radio equipment.
- Keep antenna cabling as short as possible.

Graph Not Visible

- Use Internet Explorer 9+, Chrome or Firefox
- Enable Javascript support.
- Disable the browser's prior version compatibility mode.

Graph Shows 0% Signal Strength

- If the Signal Strength shown on the PocketPORT Configuration page is ???, the signal strength cannot be read from the modem and will display as 0% on the graph.
- Readings can only be taken when the PocketPORT is in Configuration Mode (solid red LED).
- Not all modems provide signal strength readings.

Signal Strength Varies Significantly

- Signal strength varies over time even for stationary locations due to intermittent interference, cell tower and modem power adjustments and other factors.
- A lower consistent reading is preferred over a highly variable reading that may hit higher peak values.
- The antenna may require a metal ground plane placed beneath it for proper operation.

Signal Strength is Worse with Antenna

- When changing antenna positions, allow 30-60 seconds for the signal strength readings to stabilize.
- External antennas under 3 dBi gain typically do not improve the signal strength percentage versus the modem's internal antenna but they often provide a more stable reading.
- The lower value may be due to the cellular modem reducing its power output to compensate for the higher gain antenna. If the reading results in a very poor signal, the antenna may be in an unfavorable location, or is not tuned for the cellular carrier's frequencies, or there may be a short in the antenna lead cable.
- A the signal loss due to a long cable run or multiple connectors may be offsetting the gain from the antenna.

3. IP Pass-Through / Bridge Mode (default)

IP Pass-Through / Bridge Mode is the simplest way to use the PocketPORT. In this mode, the PocketPORT is essentially “invisible” to the Ethernet and USB devices attached to it. The PocketPORT makes a connection through the USB modem and passes the IP address received from the cellular carrier onto the device attached to the Ethernet port.

Use IP Pass-Through Mode when you simply want to connect an Ethernet device to the Internet and have the Ethernet device receive an IP address from the cellular network. In general, there are no required settings for IP Pass-Through Mode. The PocketPORT 2's AutoConfig feature makes using this mode “plug and play” for most USB modems.

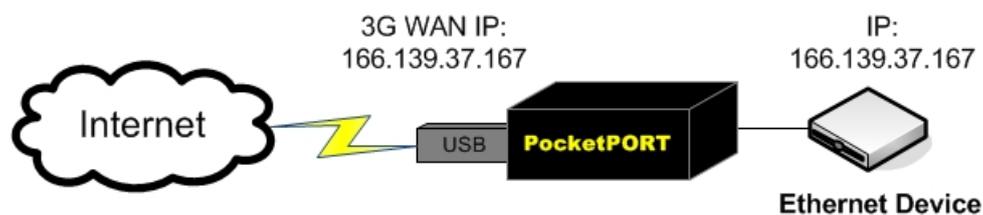


Figure 9: IP Pass-Through / Bridge Mode

All “inbound” traffic from the Internet is automatically passed through to the attached Ethernet device. Typically, only 1 Ethernet device is attached to the PocketPORT when operating in IP Pass-Through/Bridge Mode; however, the PocketPORT can be attached to the WAN port of another device such as a NAT router (but not an Ethernet switch or hub) to share the cellular Internet connection among multiple devices.

Configure the Ethernet device for DHCP to automatically receive its IP configuration information (IP address, subnet mask and default gateway). Once the PocketPORT receives the IP information from the cellular carrier, it will respond to DHCP requests from the Ethernet device with the cellular IP data. You may need to release and renew your Ethernet device's IP setting in order to obtain the correct cellular settings.

When operating in IP Pass-Through/Bridge Mode, the PocketPORT updates its permanent DNS name with the current IP address assigned to the USB modem by the cellular carrier. The user-defined DynDNS hostname (if defined) is also updated with this IP address.

The PocketPORT operates in IP Pass-Through/Bridge mode the first time it is powered on and after being reset to its factory default settings.

4. NAT Router Mode

In NAT Router Mode, the PocketPORT acts as a simple router, providing Network Address Translation (NAT) service by converting between a range of private IP addresses on its Ethernet interface and a single public IP address assigned to the USB modem by the cellular carrier.

Use NAT Router Mode when you need the PocketPORT to provide Internet access to more than one Ethernet device (via an external Ethernet switch) or for additional security for a single device will be accessed remotely.

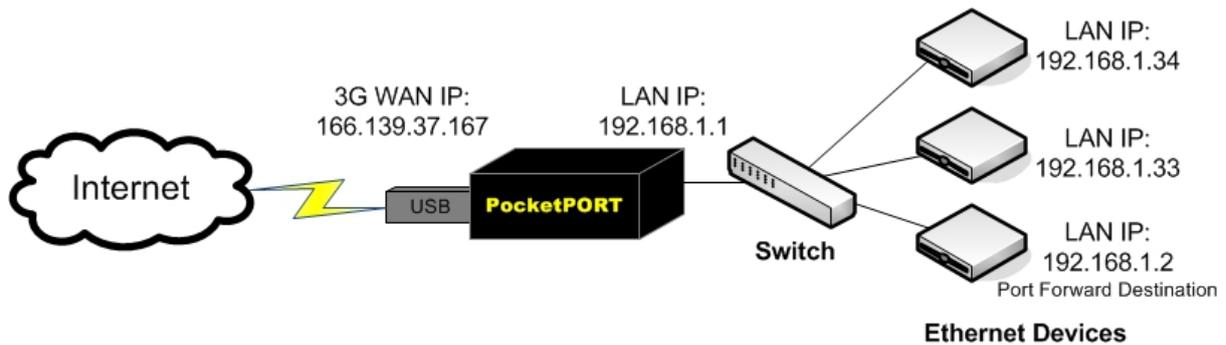


Figure 10: NAT Router Mode

The PocketPORT’s IP address and associated subnet mask can be assigned to be compatible with existing network numbering schemes. The DHCP server is also enabled so that devices attached to the network can be automatically assigned a private IP address from the PocketPORT.

When operating in NAT Router Mode, the PocketPORT updates its permanent DNS name with the current IP address assigned to the USB modem by the cellular carrier. The user-defined DynDNS hostname (if defined) is also updated with this IP address.

To remotely access a device attached to the Ethernet side of the PocketPORT, you must configure the private IP address of that device in the “Forward All Inbound Traffic to IP” field. This setting forwards all ports and inbound traffic to the designated LAN IP address (i.e. virtual host/DMZ). Only 1 IP address can be configured as the port-forwarding destination. The port forwarding destination device should have a statically assigned LAN IP address (see 192.168.1.2 in Figure 11).

NAT Router Mode Settings		
LAN IP Address	192.168.1.1	IP address for the PocketPORT's LAN port
LAN IP Subnet Mask	255.255.255.0	Subnet mask for LAN
DHCP Pool Start Address	192.168.1.33	Starting DHCP Server IP address
DHCP Pool End Address	192.168.1.161	Ending DHCP Server IP address
Forward Inbound Traffic on All Ports to this IP Address	192.168.1.2	IP address on LAN to receive inbound traffic (Virtual Host)

Figure 11: Sample NAT Router Mode Parameters

5. Virtual Cable Mode

A unique feature of the PocketPORT is “Virtual Cable Mode” (VCM). In this mode, two or more PocketPORT’s act as a very long virtual Ethernet cable. The cellular network is completely transparent to the user; the ends appear to be directly connected via cable. Any application that works over a direct Ethernet cable also works over the PocketPORT’s Virtual Cable system.

Virtual Cable Mode is especially useful for software applications that expect external LAN hardware to be on same physical Ethernet segment (i.e. “flat networks”). For example, some PLC programming and monitoring applications broadcast probe packets to locate their associated hardware. These packets typically do not traverse routed networks or the Internet, but will be forwarded to the remote equipment when it is connected via Virtual Cable Mode, even across a cellular Internet connection.

The PocketPORT uses end-to-end encryption on all Virtual Cable connections. Networks are protected by a shared password (pre-shared key), known only to the participating nodes. No software needs to be installed on any device, so users can comply with security policies regarding third-party software installations. Closed systems such as cameras and PLC’s can have fully protected connections over the Internet even though they can’t run VPN software. The PocketPORT’s VCM is completely self-contained and autonomous.

Note: *Beginning with PocketPORT firmware version 1.5.2, Virtual Cable Mode throughput performance can be increased by not providing a Network Password value on each PocketPORT. This disables encryption – all data will be transferred between nodes in its native format. All nodes must have the same (or no) Network Password in order to communicate.*

Unlike traditional VPNs where the networks on each side of a connection are in different subnets, the network addresses on both sides of a Virtual Cable connection must be in the same subnet (see Figure 12).

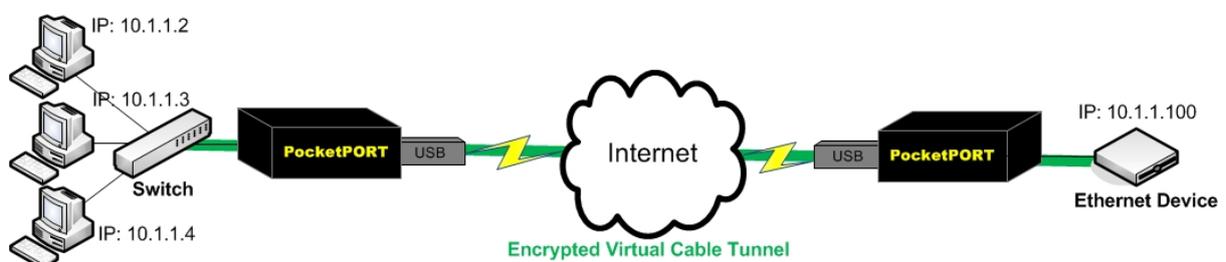


Figure 12: Virtual Cable Mode

Virtual Cable Mode requires at least 2 PocketPORTs, however, each PocketPORT does not require a USB modem. There are several different network “topologies” for Virtual Cable Mode, depending on your requirements and the availability of WAN connections.

5.1 Configuring Virtual Cable Mode

To use Virtual Cable mode, assign each of the Ethernet devices attached to the PocketPORT its own private IP address that is in the same subnet as the device(s) connected to the other PocketPORT. Take care when assigning IP addresses on each side of the Virtual Cable connection to avoid IP address duplication. Services such as DHCP and BootP will traverse a Virtual Cable connection, so remote devices can obtain their IP address information from a central DHCP server to ease remote IP management issues. Once the Virtual Cable connection is established, devices on either side of the connection can be accessed as if they are plugged into the same local Ethernet switch. To optimize performance, keep the number of devices connected to the LAN side of each PocketPORT to a minimum.

Virtual Cable Settings (Virtual Cable Mode Only)		
Switchboard Server Address	vc.pocketport.net:9999	Set to <i>vc.pocketport.net:9999</i> to use Proxicast's server
Account Name	user@mydomain.com	Enter your email address or another globally unique identifier
Network Name	TestNet	Enter a unique network name (same value on both PocketPORTs)
Network Password	Password1234	Enter an encryption key to secure your private network

Figure 13: Sample Virtual Cable Mode Parameters
(must be the same on both PocketPORTs)

When in Virtual Cable Mode, the PocketPORT functions as an Ethernet bridge. The LAN IP and DHCP settings in the NAT Router Mode Settings section do not apply. Figure 13 shows an example of the Virtual Cable Mode settings which must be entered on both PocketPORT devices.

5.2 Virtual Cable Mode Settings for PocketPORTs with USB Modems

PocketPORTs to be used as Virtual Cable Mode end-points that have a USB modem inserted into the PocketPORT require only the configuration settings shown in Figure 13 in addition to any USB modem settings required for a connection. You may also set Auto Ping and DynDNS parameters if desired.

5.3 Virtual Cable Mode Settings for PocketPORTs without USB Modems

If your existing networks already have Internet connections via another gateway/router, it is not necessary to have a USB modem attached to the PocketPORT in order to create a Virtual Cable connection to another PocketPORT (see Figure 14). In this instance, the PocketPORT will attempt to obtain its IP address information from a DHCP server on your network. No other PocketPORT configuration is required.

If your network does not have a DHCP server (or you wish to assign a specific IP address to the PocketPORT), add the following configuration directives to the Additional Configuration Settings field:

IP=x.y.z.t NM=a.b.c.d DG=e.f.g.h
where:

- x.y.z.t is a private static IP address assigned to the PocketPORT
- a.b.c.d is the appropriate subnet mask
- e.f.g.h is the IP address of a default gateway which has Internet access on the local network

Each PocketPORT must have a unique IP address assigned either by DHCP or manually entered in the Advanced Configuration Settings field. The PocketPORT's IP address must be within the same subnet as the Ethernet devices attached to the PocketPORT.

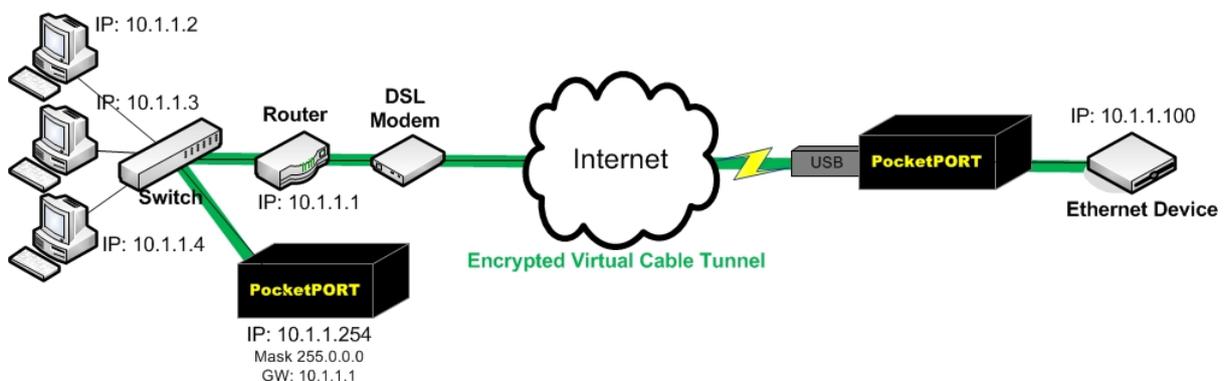


Figure 14: Virtual Cable Network Extension

5.4 One-to-Many Virtual Cable Mode Connections

It is also possible to connect many Virtual Cable PocketPORTs together into a complete VPN spanning several sites. As long as all of the PocketPORTs have the same Virtual Cable network names and passwords and their attached Ethernet devices are in the same subnet, they will be visible to each other in a flat “virtual” network configuration (see Figure 15). This is a common topology where a central location must monitor multiple remote sites. This also provides “peer-to-peer” communications among all of the remote devices which are on the same subnet.

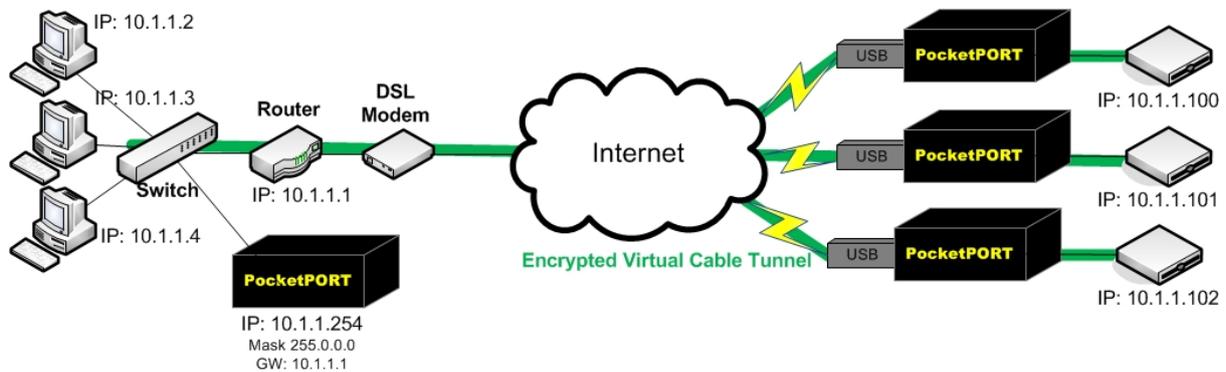


Figure 15: One-to-Many Virtual Cable VPN Connections

See the PocketPORT Support web site (<http://www.proxicast.com//PocketPORT>) for more example Virtual Cable Mode configurations.

6. Accessing Remote Devices

A common use for the PocketPORT is to provide access to remote Ethernet equipment from other locations on the Internet. For IP Pass-Through/Bridge Mode and NAT Router Mode, there are three ways to remotely access Ethernet devices connected to the PocketPORT.

1. Static IP Address
2. PocketPORT Dynamic DNS Name
3. DynDNS Dynamic DNS Name

When operating in Virtual Cable Mode, remote devices can be accessed by their “private” IP address, just as if they were connected to your local Ethernet network.

6.1 Static IP Address

Some cellular service providers offer a “static” or “permanent” public IP address that is assigned to the USB modem. There is often an additional fee for this feature.

If the USB modem has been assigned a static IP address, the PocketPORT will automatically receive that IP address when it connects to the cellular network – no special configuration is required. Use the assigned static IP address to access remote Ethernet devices.

6.2 PocketPORT Dynamic DNS

Most cellular service providers assign a random (dynamic) IP address to the USB modem every time a new connection is made. This makes it impossible to use the modem’s cellular IP address to access remote devices. The solution to this problem is a technique called “dynamic DNS”. With dynamic DNS, a unique “fully qualified domain name” (FQDN) is defined to represent the device with a dynamic IP address. Software on the PocketPORT then updates the DNS system with the FQDN’s new IP address every time that the IP address changes.

Proxicast maintains a dynamic DNS service which assigns each PocketPORT a unique and permanent FQDN based on the PocketPORT’s serial number in the form: serial#.pocketport.net (e.g. 001B39AB12CD.pocketport.net). The IP address for this DNS name is updated automatically every time the PocketPORT makes a new cellular connection.

Use this FQDN to access an Ethernet device connected to the PocketPORT from anywhere on the Internet. For example, if the Ethernet device has an embedded web server, you can access it with a web browser by using the address: <http://001B39AB12CD.pocketport.net>

6.3 DynDNS Dynamic DNS

If you wish to define your own (perhaps more memorable) FQDN, the PocketPORT supports the widely used DynDNS.com dynamic DNS service.

Visit DynDNS.com to create a username, password and hostname. Enter these values into the DynDNS section of the PocketPORT’s configuration page (see Section 2.6 *DynDNS Settings*). The PocketPORT will automatically update the DynDNS.com servers every time a new cellular IP address is assigned. Use the defined hostname (e.g. myhost.dyndns.com) to remotely access the Ethernet device attached to the PocketPORT.

6.4 Port Forwarding – NAT Router Mode

To remotely access an Ethernet device when operating the PocketPORT in NAT Router Mode, the “private” IP address of the Ethernet device must be defined as the Port Forwarding destination for the NAT Router.

Enter the IP address of the target Ethernet device in the “Forward Inbound Traffic on All Ports to this IP Address” field in the PocketPORT’s Configuration page (see Section 2.4 NAT Router Mode Settings). If no IP address is configured in this field, the Ethernet device cannot be remotely accessed. Only a single IP address can be configured as the Port Forwarding destination. All ports are forwarded to this IP address – the PocketPORT does not perform any packet/port filtering.

6.5 Cellular Operator Restrictions

Some cellular service providers assign “private” IP addresses to USB modems in the ranges of:

- 10.0.0.0 – 10.255.255.255
- 172.16.0.0 – 172.31.255.255
- 192.168.0.0 – 192.168.255.255

Private IP addresses cannot be used in remote access applications (except in Virtual Cable Mode). Request that the cellular carrier provide a routable “public” IP address for your modem. For GSM/LTE modems, this may involve changing the Access Point Name (APN) used to connect to the GSM/LTE network.

Also, some cellular service providers may block certain (or all) “inbound” traffic from the Internet based on the type of service to which you have subscribed. Check with the service provider for more information on your options for unblocking inbound connections from the Internet to the PocketPORT. If you are unable to obtain an unblocked cellular connection, consider using Virtual Cable Mode which uses “outbound” connections to link two sites into a virtual private network.

Note for Verizon Wireless 4G/LTE Users:

The Verizon Wireless 4G/LTE network assigns private IP addresses by default. In order to use the Verizon Wireless 4G/LTE network for remote access and/or control applications, you must request a “static IP” address from Verizon Wireless or utilize two or more PocketPORTs in Virtual Cable Mode to create an Ethernet bridge between the devices. This is a restriction in how the Verizon Wireless 4G/LTE network is implemented and not a limitation of the PocketPORT. See Section 5. Virtual Cable Mode for more information.

Note for AT&T Wireless Users:

The default data service plan from AT&T Wireless assigns private IP addresses to USB modems. In order to use the AT&T Wireless network for remote access and/or control applications, you must request “mobile terminated data service” from AT&T Wireless in order to obtain a public IP address. Or you may utilize two or more PocketPORTs in Virtual Cable Mode to create an Ethernet bridge between the devices. This is a restriction in how the AT&T Wireless network is implemented and not a limitation of the PocketPORT. See Section 5. Virtual Cable Mode for more information.

7. Firmware Updates

Periodically, new PocketPORT firmware is released to add features, additional modem support, and to correct any issues reported in previous versions. Visit <http://www.proxicast.com/PocketPORT> for more information on the availability of PocketPORT firmware updates.

The PocketPORT 2's firmware can be updated using either the built-in web configuration utility, or via an external USB memory stick (flash drive).

Unless otherwise stated in the firmware Release Notes, updating the PocketPORT firmware will not erase any previously saved configuration settings.

7.1 Firmware Updates via Web Configuration Screen

Updating the PocketPORT firmware via the Configuration screen is a two-step process. First the new firmware image must be copied to the PocketPORT. Second, the new firmware must be flashed into permanent memory.

Once you have downloaded the new firmware file (".bin") from Proxicast, click the **Update Firmware** link at the bottom of the Configuration Screen (Figure 7). You will then be prompted to upload the firmware file for the PocketPORT (Figure 16).



Figure 16: Uploading new PocketPORT firmware

Select **Browse...** to locate the firmware file, and **Upload** to copy the file to the PocketPORT. Once the file is uploaded, the screen in Figure 17 appears. Click **Begin Flashing** to update the PocketPORT's firmware. Do not interrupt the flashing process. Once flashing begins, the Status LED will flash rapidly violet for approximately 60 seconds, then the PocketPORT will reboot and the Status LED will slowly flash red.



Figure 17: Flashing new PocketPORT firmware

7.2 Firmware Updates via USB Memory Stick

The PocketPORT 2's firmware can be updated without user intervention by placing the firmware file at the root of a FAT32 formatted USB memory stick and powering on the PocketPORT 2 with the memory stick inserted in PocketPORT's USB port.

- Download the new firmware file (".bin") from Proxicast and copy it to the "root" level (top) directory of a USB memory stick. There must be no other files ending in ".bin" located in the root directory of the memory stick.
- Insert the USB memory stick in the PocketPORT and apply power.
- After 10-20 seconds, the PocketPORT's Status LED will rapidly flash violet for approximately 60 seconds.
- Once the Status LED slowly flashes red again, you may remove the USB memory stick.

7.3 Reset to Factory Defaults

To return the PocketPORT to its "factory default" configuration settings:

- Press and hold the Reset button for 10 seconds until the Status LED alternates between red and blue flashing.
- Release the Reset button.
- After 10 seconds of alternate red/blue flashing, the Status LED will slowly flash red.
- The PocketPORT is now in IP Pass-Through/Bridge Mode. To reconfigure the PocketPORT, press the Reset button again for 2 seconds once the Status LED begins to slowly flash red. Then access the Configuration Screen using a web browser at <http://192.168.1.1:8080>

8. Troubleshooting & FAQ's

8.1 Troubleshooting

USB modem does not go online (Status LED slowly flashes red)

- There may be poor cellular signal strength at your location. Go into Configuration Mode and check the Signal Strength. Move to a different location or attach an external antenna and/or amplifier to the USB modem.
- The USB modem configuration settings may be incorrect. Go into Configuration Mode and check the settings against the modem-specific settings on Proxicast's Technical Support website (<http://www.proxicast.com/PocketPORT>).

Ethernet device does not receive an IP address

- Confirm that the Ethernet device is configured to request an IP address via DHCP.
- Release/renew the Ethernet device's DHCP settings.
- Unplug and re-insert the Ethernet cable.
- Restart the Ethernet device.
- In Virtual Cable Mode, you must manually assign the Ethernet device an IP address (or request an IP address from a DHCP server other than the PocketPORT).
- Some Ethernet devices do not understand the address assignment protocol used by cellular network operators. Change the PocketPORT to NAT Router mode to have it use standard DHCP protocols to assign an IP address to the Ethernet device.

Configuration Mode web page not displayed

1. Remove power from the PocketPORT.
2. Remove the USB modem.
3. Apply power and wait for the Status LED to slowly flash red.
4. Enter Configuration Mode (hold Reset button for 2 seconds).
5. Disable all network interfaces on your PC (e.g. WiFi) except for the Ethernet LAN.
6. Check your PC's IP settings (PocketPORT will be at 192.168.1.1:8080).

USB modem goes online and offline every few minutes

- Check the Auto Ping Destination Address to ensure that it is reachable. If your USB modem has been assigned a "restricted" IP address (with no or limited Internet access) by the cellular carrier, the Auto Ping Destination Address must be on the restricted network.
- There may be poor cellular signal strength at your location. Go into Configuration Mode and check the Signal Strength. Move to a different location or attach an external antenna and/or amplifier to the USB modem.

Signal strength not shown (value = ???)

- The USB modem's interface settings (e.g. DevicePort) must be set correctly before the cellular signal strength can be displayed. Configure the USB Modem settings, then restart the PocketPORT to display the signal strength. Not all USB modems are able to report their signal strength. Refer to the modem-specific settings on Proxicast's Technical Support website (<http://www.proxicast.com/PocketPORT>).
- Signal strength is always displayed as ??? when configuring the PocketPORT remotely (via WAN).

USB modem will not power up or powers on and off intermittently

- The PocketPORT requires 5 VDC ($\pm 5\%$) for proper operation of the USB modem. Use the power supply provided with the PocketPORT or ensure that the input power is well regulated.

Firmware will not update via USB memory stick

- The USB memory stick must be formatted for the FAT32 file system.
- The PocketPORT firmware file (.bin) must be located in the root directory of the memory stick.
- No other .bin files should be located in the root directory of the USB memory stick.

8.2 Frequently Asked Questions

Q: Can the USB modem be inserted/removed while the PocketPORT is powered on (Hot-Plug)?

A: No. To protect the PocketPORT and the USB modem, Proxicast recommends powering the PocketPORT off before inserting or removing the USB modem. Removing or inserting a modem while the PocketPORT is powered on may cause the PocketPORT to lock-up.

Q: Can the configuration of one PocketPORT be copied to another PocketPORT?

A: Yes. After confirming that the configuration settings are correct, enter Configuration Mode and click the Generate Settings button. Copy the generated settings into a temporary file on a computer. Enter Configuration Mode on the second PocketPORT and paste the saved settings into the Generated Settings window and click the Write Configuration button.

Q: Can more than 1 remote device be accessed in IP Pass-Through Mode or NAT Router Mode?

A: No. In IP Pass-Through/Bridge Mode, the PocketPORT is transparent to the Internet connection. All traffic is passed directly to the attached Ethernet device. In NAT Router Mode, only 1 IP address can be defined as the destination for port-forwarding. However, in either mode, if the PocketPORT's Ethernet port is connected to the WAN port of an external NAT router, multiple devices behind the router can be reached remotely by using the Port Forwarding feature of the router.

Q: What IP address should be used for the Auto Ping Destination?

A: Any IP address or Fully-Qualified Domain Name may be used as the Destination Address. Proxicast recommends using a Destination Address which has very high availability or is under your direct control. If the Destination Address fails to respond within the designated times, the PocketPORT will drop its cellular connection. Typical choices are the public IP address of your company's mail or web server, the address from which you are trying to connect, or a DNS server on the cellular network to which the PocketPORT is connected. The default address is a Google public DNS server (8.8.8.8). If your USB modem has been assigned a "restricted" IP address (with no or limited Internet access) by the cellular carrier, the Auto Ping Destination Address must be on the restricted network.

Q: In Virtual Cable Mode can the PocketPORT also access the Internet (e.g. Split Tunneling)?

A: Not directly. All traffic from the Ethernet side of the PocketPORT is routed to the matching PocketPORT through the encrypted virtual cable tunnel. In order to access resources on the Internet, another gateway would have to be present somewhere on the network.

Q: Can third-party VPN products (hardware or software) connect to a Virtual Cable Mode VPN?

A: No. Virtual Cable Mode connections can only be made between PocketPORT devices.

Q: Can the PocketPORT be configured remotely?

A: Yes with PocketPORT firmware version 1.4 and later. The Configuration Screen can be accessed by entering the DDNS name (or IP address) of the PocketPORT into any Internet-connected web browser. You can configure the remote management port number on the Configuration Screen. The default remote management port is 8080, so a PocketPORT can be managed by entering <http://serial#.pocketport.net:8080> into a web browser.

Q: What if my USB modem is not auto-configured by the PocketPORT?

A: Check the PocketPORT Support web site <http://www.proxicast.com/PocketPORT> to see if the modem is supported by a newer PocketPORT firmware revision or if any special modem preparations or PocketPORT settings are necessary.

Q: How can cellular connection “uptime” be maximized?

A: Proxicast recommends the following settings:

- Maximize the signal strength available to the USB modem. Consider an external antenna and/or amplifier if signal strength is weak. See Proxicast’s TechNote: [Cellular Antenna Issues](#) on our web site for more information on selecting and installing external antennas. Optionally, use a USB extension cable to relocate just the USB modem to a more favorable location.
- Enable the Reboot on Disconnect feature.
- Use Auto Ping to a high availability destination, preferably on the cellular carrier’s network (DNS and mail servers run by the carrier are good choices). Set the ping frequency to a maximum of 10 seconds.
- Use an external IP-enabled power switch to reset the PocketPORT’s power when Internet service is lost. See: http://shop.proxicast.com/shopping/index.php?dispatch=products.view&product_id=29918

9. Technical Specifications

Mechanical	
Dimensions	62mm x 23mm x 15mm 2.4in x 0.9in x 0.6in
Weight	25 grams
Operating Temperature	-10° C ~ 55° C
Operating Humidity	10% ~ 80% RH
Storage Temperature	-20° C ~ 60° C
Storage Humidity	5% ~ 90% RH
Electrical	
Operating Voltage	5 VDC (regulated to ±5%)
Power Consumption	0.75 W without USB modem 2.5 W (typical) to 5.0 W depending on USB modem
Power Jack	Micro USB
Interfaces	1x USB 2.0 (USB modem) 1x RJ45 (10/100 Ethernet)
Certifications	FCC Class B, CE
External Power Adapter	7.5 W (5 VDC @ 1.5A), 100~240 VAC input
Software Features	
Operating Modes	IP Pass-Through/Bridge NAT Router Virtual Cable (VPN)
# LAN Devices Supported	1 (IP Pass-Through/Bridge mode) 253 (NAT Router mode) Unlimited (Virtual Cable mode)
User Definable IP Address	Yes
DHCP Server	Yes, user configurable (NAT Router mode)
Dynamic DNS Support	Permanent dynamic DNS hostname: <i>serial#.pocketport.net</i> User-definable DynDNS.com hostname
Encryption Algorithm	Twofish, 256 bit keys (Virtual Cable mode)
Authentication	Pre-shared Key (Virtual Cable mode)
Connection Behind Firewalls	Yes
SIM / RUIM Pin Support	Yes
Device Configuration	Web-browser based (HTTP)
Firmware Updateable	Yes
3G/4G Features	
Modems Supported	Most USB form-factor CDMA, GSM, LTE, EVDO, HSPA, UMTS modems
Automatic Configuration of Modem Settings	Yes
Connection Monitoring	Yes w/ automatic ICMP (ping) keep-alive heartbeat function
Connection Types	Static IP, Dynamic IP, Custom APN
Signal Strength Display	Yes, dependent on USB modem's capabilities, including signal strength history graph

10. Contacts & Support

Online Web Support

Please refer to <http://support.proxicast.com> for additional support documentation and access to our Knowledgebase which contains many resources such as TechNotes, Frequently Asked Questions, sample configurations and software updates.

E-Mail Support

Support E-mail: support@proxicast.com

Please provide the following information when you contact customer support:

- Product model and serial number
- Current firmware version running on your device
- Brief description of the problem and the steps you've taken to try to solve it

Return Merchandise Authorizations (RMA)

If you need to return a product for service, you must contact Technical Support and request an RMA Number. Returns will not be accepted without an RMA Number on the outside of the shipment.

Please return only the main product unit (no accessories) unless otherwise directed by Proxicast Technical Support.

Securely pack and insure the product. Return shipping costs are the responsibility of the customer.

Corporate Headquarters

- Sales E-mail: sales@proxicast.com
- Telephone: 877-777-7694 (412-213-2477)
- Fax: 412-492-9386
- Web Site: www.proxicast.com, support.proxicast.com
- Regular Mail & RMA Shipments:
 - Proxicast, LLC
 - 312 Sunnyfield Drive, Suite 200
 - Glenshaw, PA 15116-1936

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The device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operations.

This device has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

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Version 3, 29 June 2007

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