QUICK START GUIDE FOR THE TRANZEO WIRELESS TR-6000 SERIES

REVISION 2.0a
JANUARY 2ND, 2006

FCC Information

This equipment 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 when the equipment is operated in a Residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication.

Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

The user should not modify or change this equipment without written approval from Tranzeo Wireless. Modification could void authority to use this equipment.

For the safety reasons, people should not work in a situation which RF Exposure limits be exceeded. To prevent the situation happening, people who work with the antenna should be aware of the following rules

1. Install the antenna in a location where a distance of 40 cm from the antenna may be maintained.
2. While installing the antenna, do not turn on power to the unit.
3. Do not connect the antenna while the device is in operation.
4. The antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Safety Notices

Safety Precautions:

YOU MUST READ AND UNDERSTAND THE FOLLOWING SAFETY INSTRUCTIONS BEFORE INSTALLING THE DEVICE:

- This antenna's grounding system must be installed according to Article 810-15, 810-20, 810-21 of the National Electric Code, ANSI/NFPA No. 70-1993. If you have any questions or doubts about your antenna grounding system, contact a local licensed electrician.
- Never attach the Grounding Wire while the device is powered.
- If the ground is to be attached to an existing electrical circuit, turn off the circuit before attaching the wire.
- Use the Tranzeo POE only with approved Tranzeo models.
- Never install Radio Equipment, surge suppressors, or lightning protection during a storm.

A BRIEF WORD ON LIGHTNING PROTECTION

The key to a Lightning Protection is providing a harmless route for lightning to reach ground. The system should not be designed to attract lightning, nor can it repel lightning. National, State and local codes are designed to protect life, limb and property, and must always be obeyed.

When in doubt, consult local and national electrical codes or contact an electrician or professional trained in the design of grounding systems.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Introduction

This next-generation wireless LAN device – the TRANZEO TR-6000 series, brings Ethernet-like performance to the wireless realm. Fully compliant with the IEEE802.11a standard, the TRANZEO TR-6000 series also provides powerful features such as the Internet-based configuration utility as well as WEP and WPA security. Maximize network efficiency while minimizing your network investment and maintenance costs.

Hardware Installation

Product Kit
Before installation, make sure that you have the following items:

- The TR-6000 series x 1
- DC Power Adapter x 1
- Power over Ethernet Adapter x 1
- Ethernet Boot x 1
- Mounting Bracket x 1
- Kept Nuts (With Washer Attached) x 8
- U-Bolt w/ 2 Nuts x 1
- RJ-45 Patch Cable x 1
- Ethernet Boot Gasket x 1
- Ethernet Cable Lock x 1

If any of the above items is not included or damaged, please contact your local dealer for support.

In this Manual, the symbol ❷ will be used to indicate changes that were introduced in Version 2.0.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Mechanical Description

LED panel of the Wireless LAN Smart Access Point
The following table provides an overview of each LED activity:

Label	Color	Indicators
POWER	Red	On: Powered On Off: No Power
LAN	Green	On: Ethernet Link Flashing : Ethernet Traffic Off: No Ethernet Link
Radio	Amber	On: Radio Link Flashing Radio Activity Off: No Radio Link
Signal	Red/Amber/Green	In CPE mode, light up in sequence to indicate signal strength

In AP mode the signal lights indicate the following:

Color	Indicators
Red	On: WEP/128 Enabled Flashing: WEP/64 Enabled Off: WEP Off
Amber	On: WPA/AES Enabled Flashing : WPA/TKIP Enabled Off: WPA Off
Amber	ON: 5.8 Operation Off: 5.3 Operation
Green	On: ACL Enabled Off: ACL Off
Green	On: WDS Enabled Off: WDS Off

Power Supply

ONLY use the power adapter supplied with the TR-6000 series. Otherwise, the product may be damaged.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Hardware Installation

Take the following steps to set up your TR-6000 series.

Site Selection: Before installation, determine the TR-6000 series unit's location. Proper placement of the unit is critical to ensure optimum radio range and performance. You should perform a Site Survey to determine the optimal location. Ensure the CPE is within line-of-sight of the Access Point. Obstructions may impede performance of the unit.

Tools Required to Install

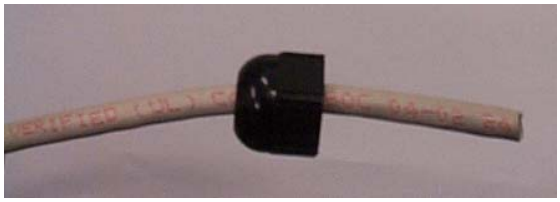
- One 3/8 wrench
- One 3/4 wrench
- One RJ-45 crimper
- A suitable length of Cat 5 cable to bring the signal from the unit to the Power over Ethernet Adaptor
- 2 RJ-45 Jacks

Before installing, you must determine if the unit will be in the horizontal or vertical orientation. The TR-6000 series model can be mounted in either orientation. The Ethernet boot should always be placed so that the cable runs toward the ground for maximum environmental protection.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Connecting the Ethernet Cable

Step 1



Place the Ethernet Boot Cover over the end of your Cat 5 cable.

Step 2

Attach Ethernet Cable Lock on side of the Ethernet Boot. This is easiest to do before you attach the RJ-45 Jack.

Step 3

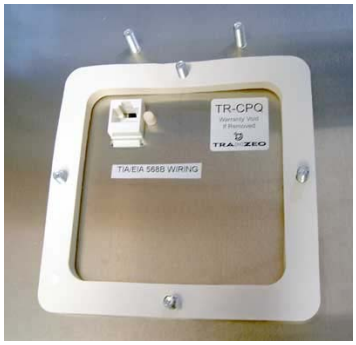
Tighten using a ¾" wrench or socket. Tighten until the Cable Lock touches the Boot as shown in Step 3**.**

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Step 4

Repeat steps 2 & 3 to attach the second Ethernet Cable Lock if you purchased the optional dual port boot.

Step 5



Place Sealing Gasket over screws.

Step 6

Remove gasket backing and place boot cover on radio. This will ensure that you attach the sticky side of the gasket to the underside of the Ethernet Boot. Make sure the Gasket is free of gaps.

Step 7

Insert the Cat 5 Cable and tighten the Boot Cover. Be sure to pull enough cable through to reach the RJ-45 connector with an RJ-45 jack attached. The Gasket must be attached to the Boot so that it sits between the radio and the boot.

Hand tighten only. **DO NOT OVERTIGHTEN** as you may damage the environment seal.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

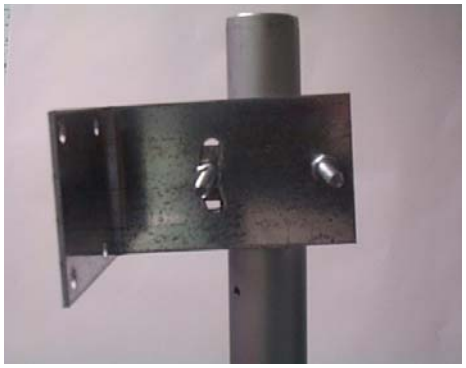
Step 8

Place the Ethernet boot over the 4 Screw Posts. Apply 4 Kept nuts to the screw posts and tighten until the gasket makes full contact with the Ethernet boot. The gasket should be at least 50% compressed.

Optional dual port boot specific note.
If you are not going to be using the second port make sure that it is tightened down to ensure a weather-tight seal.

Attaching the Mounting Bracket

As shown below, the U-Bolt is designed to mount around a pole. Tighten bolts sufficiently to prevent any movement.



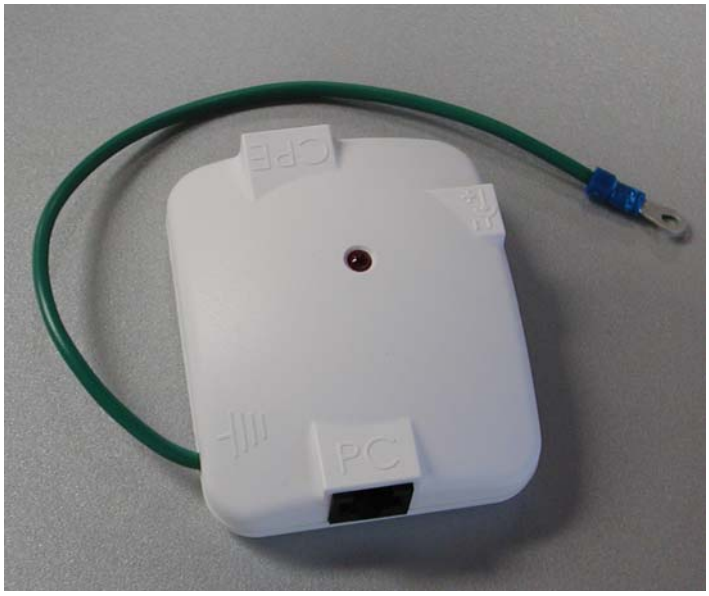
Down or up tilt can be adjusted by swinging the unit before tightening the U-Bolt.

Grounding the Antenna

Using a #6 Green grounding wire, connect the Grounding Lug on the radio to a proper ground. See APPENDIX A Lighting Information for more information.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Connect the Power Cable



Connect the power adapter to the power socket on the Power over Ethernet Adaptor (POE), and plug the other end of the power into an electrical outlet. Plug the RJ-45 Cable from the unit into the POE. The Station Adaptor will be powered on and the power indicator on the top panel will turn on.

NOTE: ONLY use the power adapter supplied with the Access Point. Otherwise, the product may be damaged.

This unit must be grounded. Connect the Green Grounding Cable to a known good earth ground, as outlined in the National Electrical Code.

Dual Ethernet Ports

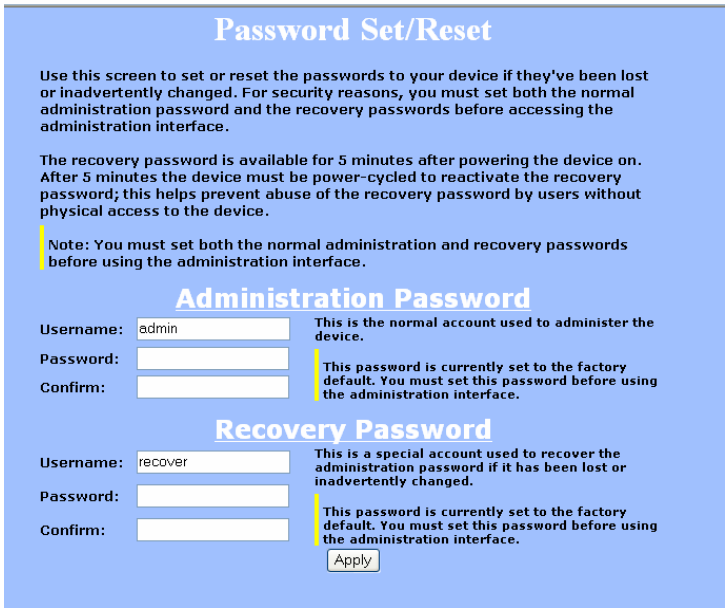
The TR-6000 series has two Ethernet port available. **Port A** is used to connect to the radio in the radio in the case. **Port B** is used to power and provide Ethernet connectivity to additional devices. This allows for the daisy chaining of multiple devices together.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

HTML Interface

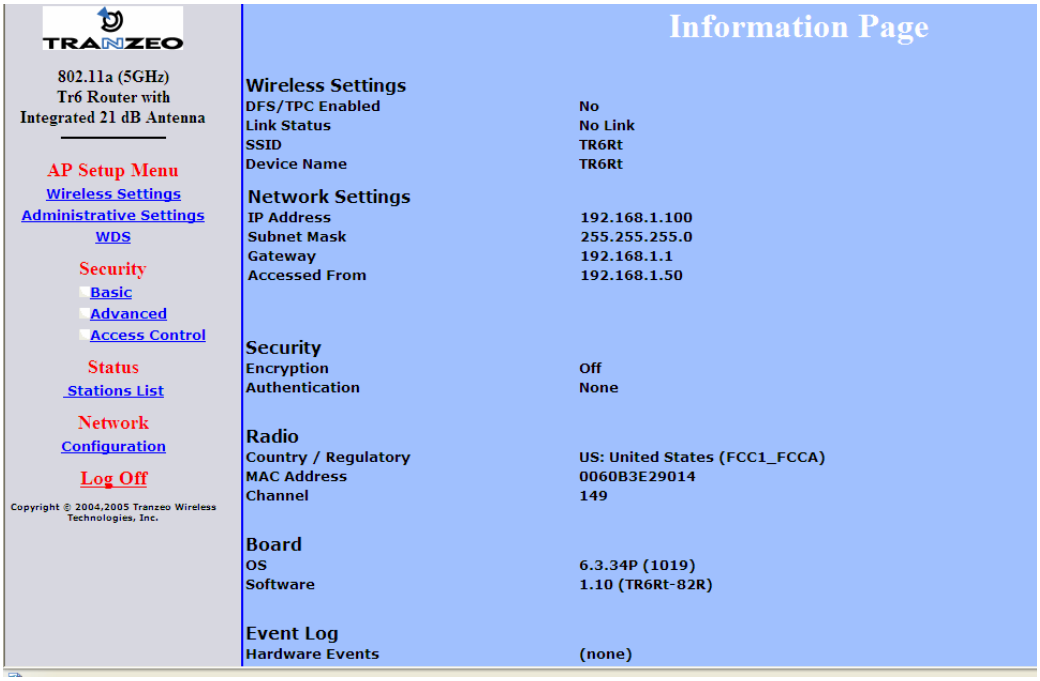
NOTE: The default IP address is **192.168.1.100**
The default User Name is **admin**
The default Password is **default**

Passwords



When you first enter the Web Interface, you will be required to enter a new recovery password. This password is intended to allow the ISP to change the password of the device if they forget it. This password must be different than the operator password. Neither password can be left at ***default***. These passwords must be changed to access the device. If you do not enter new passwords, you will return to this webpage.

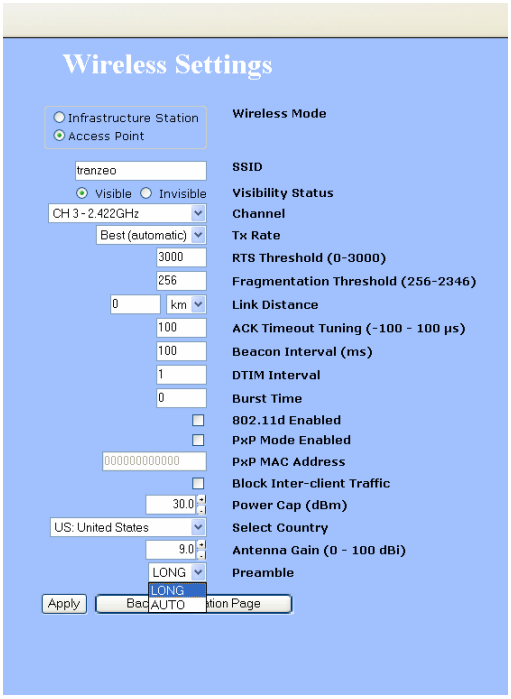
Information

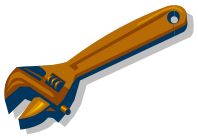


In the frame on the left, select the option you wish to configure.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Wireless Settings





PXP How to:

To operate the radio in PXP mode, one radio needs to be set to Access Point and the other set to Infrastructure.

- Set the SSID to be the same on both radios
- Channel is set by the AP
- Enter in the opposite radios' MAC address into the PxP Mac address field on both radios (no colons)
- Check off "PxP Mode Enabled"

Note: The LEDS on the radios will operate the same as in Infrastructure mode, with LEDS proportional to signal strength.

SSID
The SSID is a unique ID given to an Access Point. Wireless clients associating to the Access Point must have the same SSID. The SSID can have up to 32 characters.

Visibility Status
Makes the AP visible or invisible to clients.

Channel
Sets the channel that the AP and clients will use

TX Rate
The rate at which the radio will communicate with the clients. **NOTE:** Setting this rate below the maximum possible does not limit bandwidth, and often has a negative impact on the operation of your network.

RTS Threshold (0-3000)
Select RTS that works best in your location. A general rule of thumb is the more clients you have, the lower the value should be set.

Fragmentation Threshold
Select Fragmentation that works best in your location. The lower the Fragmentation, the smaller the packets.

Link Distance
Sets the distance of the link for correct ACK timing.

ACK Timeout Tuning (µs)
For fine tuning the ACK timing if required.

Beacon Interval
Sets the rate at which the AP will broadcast its beacons.

DTIM Interval
Sets the DTIM (Delivery Traffic Indication Message) Interval. Helps to keep marginal clients connected by sending wake up frames.

Burst Time
Sets the Burst Time in ms. which will be used to send data without stopping. Note that other wireless devices in that network will not be able to transmit data for this number of microseconds.

802.11d Enabled
Enable 802.11d mode. Not used in operation in the United States or Canada.

Block Inter-Client Traffic
Select to block wireless communications between clients on the AP.

Power Cap (dBm)
Sets the output power of the radio.

❷ Preamble
You can now set the preamble type: Long or Auto. Auto tries Short first, then Long. Long uses Long only. This feature was added to workaround some competitive AP's that did not support Auto Preamble.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Administrative Settings

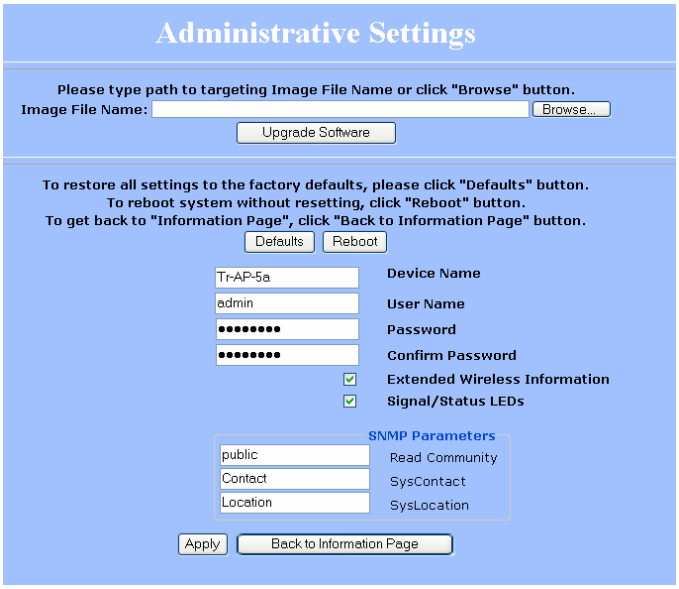


Image File Name
Enter the location of the Firmware update file, or use Browse to locate the file in your PC, and then press “Upgrade Software”

Defaults
Returns all settings to factory defaults.

Device Name
The network name of the device.

User Name
The access user name.

Password/Confirm Password
Enter the password for accessing the device

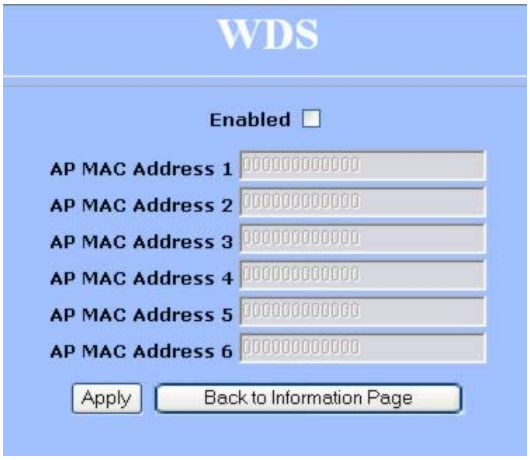
Ext. Info Enabled
Enable extended information. Extended information is only displayed with Tranzeo Wireless Technologies Access Points.

Signal / Status LEDs
Un-select to turn off the LEDs on the unit.

❷SMNP Parameters
Here you set the Read Community string and Contact / Location data. It is highly recommended that you change the SNMP Read Community string immediately to prevent unauthorized scanning of your network.
Version 2.0 supports MIB-II and the 80211 mib.
Note: The in and out values are in 64 bit values to accommodate the high amount of traffic that could pass through a backhaul link. This should not impact any monitoring program.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

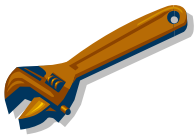
WDS



WDS (**Wireless Distribution System**) is a modification to the 802.11 spec that allows AP to communicate directly with each other. WDS allows users to spread out coverage to a larger area without the need for a backhaul link. The tradeoff is that overall throughput is greatly affected for all users of the AP's linked. WDS is not recommended for use with large numbers of clients, or in cases where throughput needs to be maximized. In cases were large numbers of users are involved, or maximum throughput is need a dedicated PxP link should be used. However, in areas of low density WDS can allow an ISP to extend coverage into an area at very low cost.

Enabled

Select this box to enable WDS



HOW TO SET UP WDS

- Default the Unit to factory settings.
- Check the ***Wireless Settings*** of the APs.
- SSIDs can be different but the Channels **MUST** be the same
- Under the ***WDS*** settings add in the MAC address of the PEER. Unit A gets Unit B's address, Unit B gets Unit A's address. Do not insert colons or commas.
- Click 'Apply'
- Ping a station connected to the opposite end. It should reply.

Considerations for the Use of WDS

1) WDS Links do not appear in the station list or the performance tab. If you need to be able to monitor the link's strength and performance you should use PxP mode.
2) Throughput is cut by 50% per link.
3) WDS does not support WPA encryption.
4) All links need to be on the same channel.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Security Settings—Basic

Enabled
Turn On WEP

Authentication
Select Open or Shared Key Authentication

Key Length
Level of Encryption. **NOTE:** 64 bit is referred to as 40 bit on some systems

Default Key
Choose the default WEP key

Activate Keys
Enter your WEP keys. **NOTE:** Keys must be entered in HEX only.

Security Settings—Advanced

Enabled
Turn On WPA

Cipher Type
Select the Level of Encryption. TKIP or AES

PSK
Enter your password

Update Interval
Enter the update interval

Enabled
Turn on 802.1x RADIUS Server Authentication

RADIUS Server IP Address
Enter the server IP

Timeout (min)
Enter the timeout period

RADIUS Server Shared Secret
Enter the name of the server

Server Port
Enter the port of the server

Access Control

Enable Access Control
Select this box to enable access control.

Associated Wireless Devices
Click any devices to disassociate them

Wireless Devices Available
Click any wireless device that should be associated with the AP

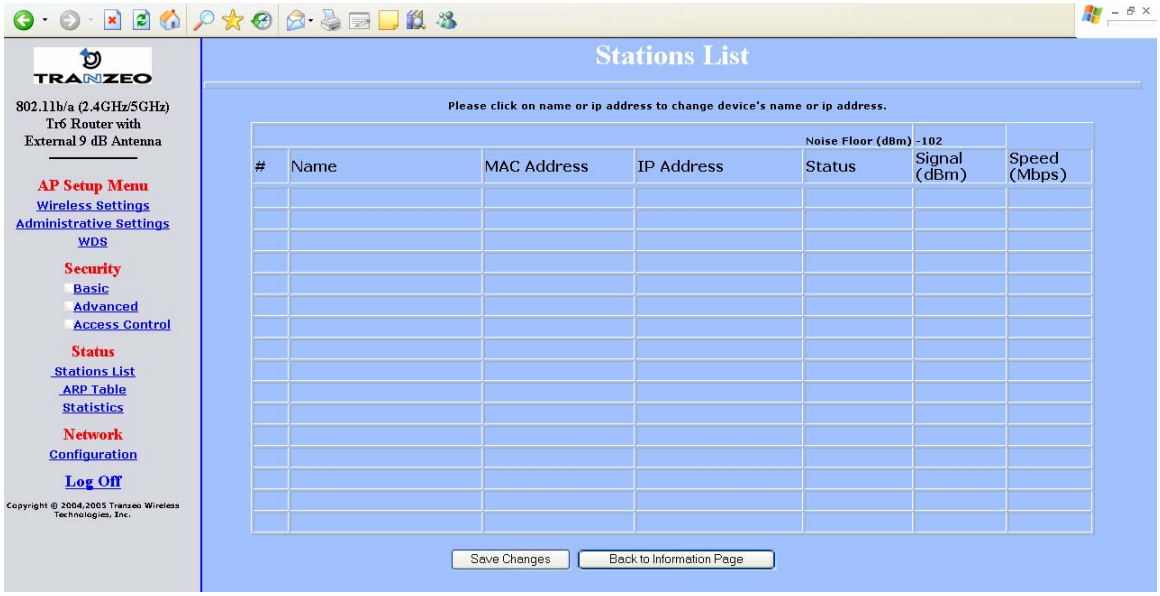
Associate With This Station Manually
Enter the MAC address of a client and then click “add” to associate with it.

❷Changes to **Access Control**

NOTE: If you are working via a radio link, the first MAC you should add is the address of the station you are connecting from. Otherwise, you will lock yourself out of the radio.

1. The Manually Authorize Stations section allows you to enter a long list of MAC address.
2. You can also select specific station that are already authorized and copy them to the Manually Authorize Stations box.
3. Data in the Manually Authorize Stations box can be copied to the clipboard to be pasted into another unit or a text file.
4. The Move button moves the MAC Address from Manually Authorize Stations to the Unauthorized list and vice versa.

Stations List (AP Mode Only)



This page displays a list of the stations associated with the AP and their connection statistics.

The first column is simply the order in which the stations are stored in the Station Table.

The second column is the name field. If the device is a Tranzeo 6000 series, and it has the Extended Info option turned on in the Administrative Settings Window, then the device name will appear here. Otherwise, the field will be blank.

You can enter a name into the field by left clicking onto the field and typing the name in. This name will be retained. However, if the Extended Info is turned on at the client, the name will be overwritten with the name on the client.

The third column is the IP address. As with the name, if the client supplies it via the Extended Info option, it will appear. Otherwise you can manually enter it.

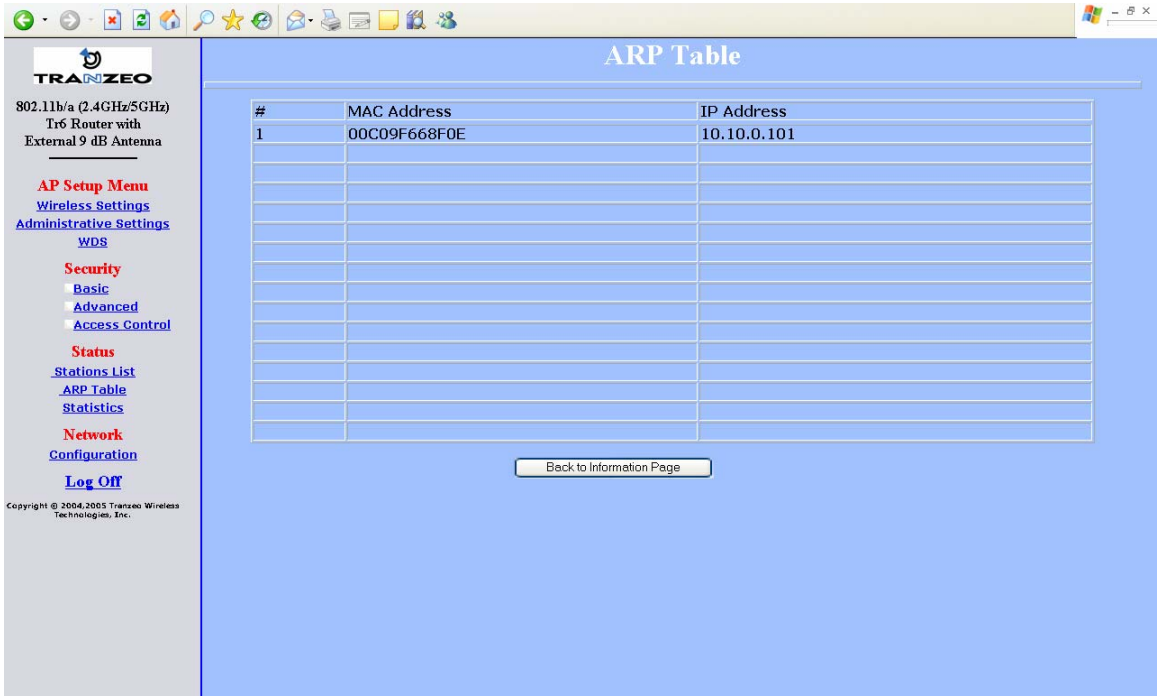
The fourth column in is the Status field.

The fifth column is the RF power in dBm as detected at the AP. This is one element of a strong link, the signal of the client end being another. Links should also be at least 10 dB higher than the receive sensitivity of the weakest element or the noise floor, whichever is higher, on both sides.

The sixth columns shows the radio speed of the link. Speed is based on both signal strength and the quality of the link. If the link is losing a lot of packets due to poor Fresnel zones or interference, the speed will be lower than the strength can support.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

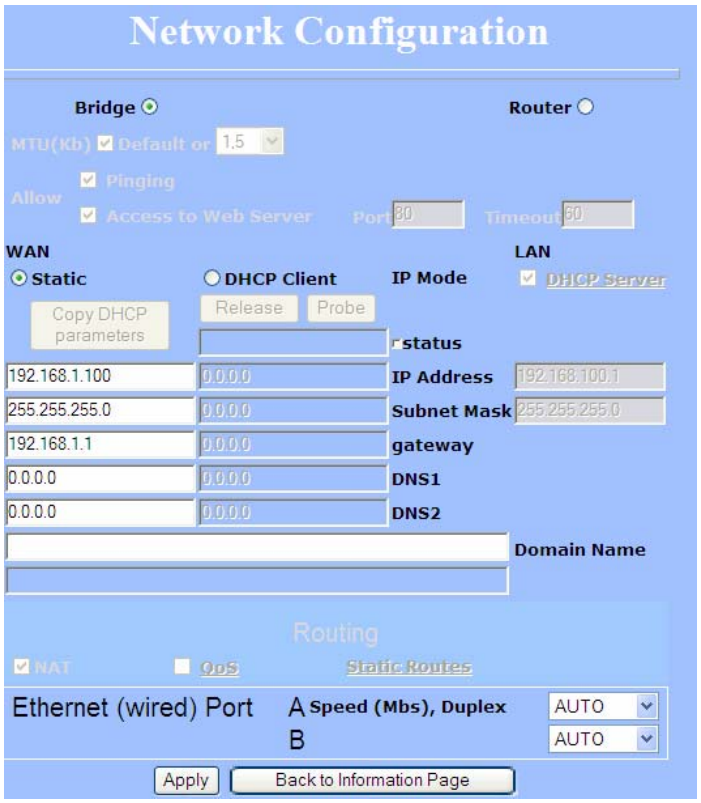
ARP Table



❷ This feature was added as a troubleshooting screen. It shows the devices which have sent either a broadcast or directly tried to communicate with the device. Under normal circumstances, there should be a limited number of entries in this table, especially if you have interstation blocking turned on at the AP.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Network Configuration – Bridge Mode



This page allows you to control the network configuration of the device.

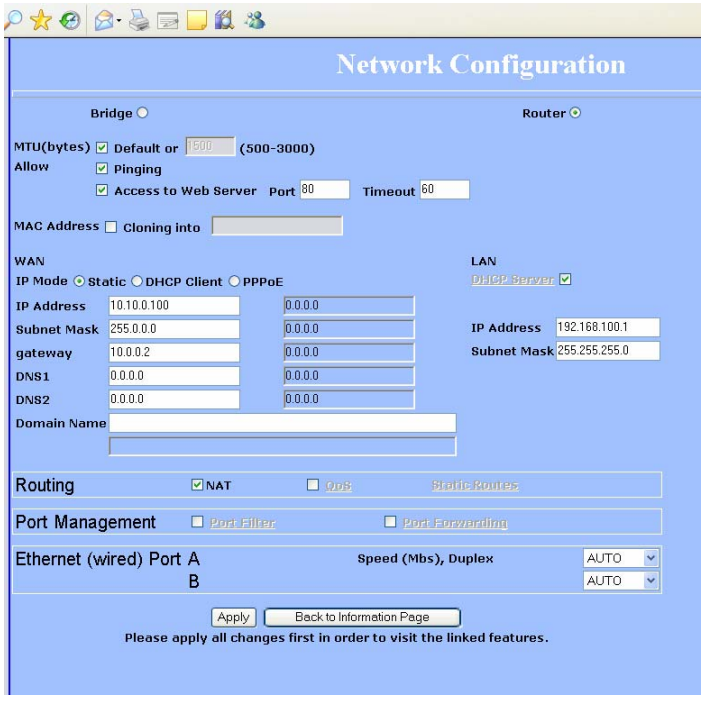
You can choose Static or DHCP Client IP configuration for the device.

Note: If you select DHCP, and a DHCP server is not present, the device will try to get an IP for up to 5 minutes. At the end on 5 minutes, it will fall back to a static IP. You can then locate it using the Locator Program and change it back to static.

You can also set the Ethernet Speed on this page.

Note: Many Ethernet devices do not auto-negotiate properly. If you see large numbers of dropped pings, you may be have collisions. Try locking the device at 10 / Half as a troubleshooting step. If the packet losses stop, step up to 100 / Half. If the device the radio is connecting can not support 100 / Half, you should replace the device or place a switch in line.

Network Configuration – Router Mode



You can choose Static, DHCP or PPPoE Client IP configuration for the device. Each of these options are explained on the following pages.

Note: If you select DHCP, and a DHCP server is not present, the device will try to get an IP for up to 5 minutes. At the end on 5 minutes, it will fall back to a static IP. You can then locate it using the Locator Program and change it back to static.

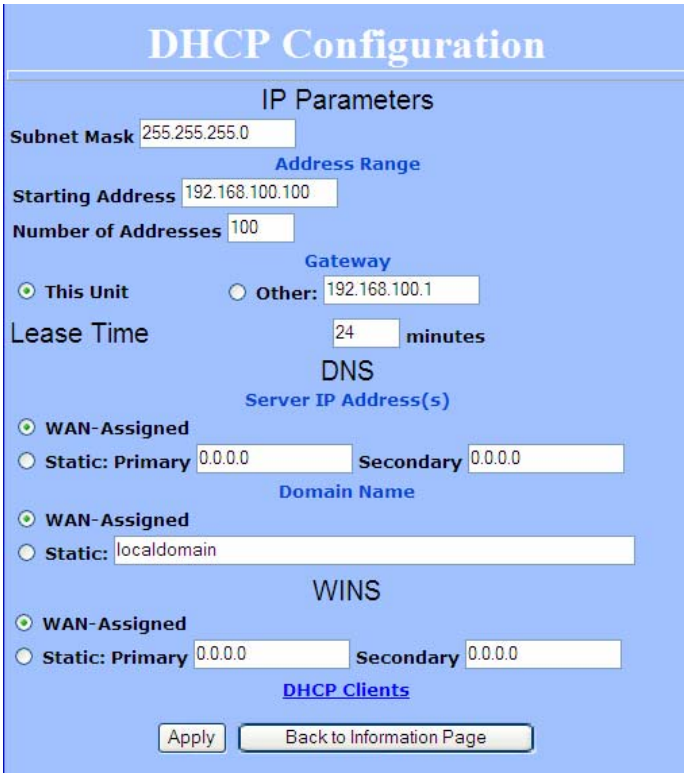
If you select a PPPoE client, and no PPPoE server can be found, you may be not be able to access the device from the WAN side. You will still be able to access it from the non-PPPoE interface.

You can also set the Ethernet Speed on this page.

Note: Many Ethernet devices do not auto-negotiate properly. If you see large numbers of dropped pings, you may be have collisions. Try locking the device at 10 / Half as a troubleshooting step. If the packet losses stop, step up to 100 / Half. If the device the radio is connecting can not support 100 / Half, you should replace the device or place a switch in line.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

DHCP Server Configuration



Subnet Mask — Subnet mask for the DHCP pool.

Address Range

Starting Address — The starting address of the DHCP pool.

Number of Addresses — The number of addresses you want to have in the DHCP pool

The addresses are sequential starting with the **Starting Address.**

Gateway — Select *This Unit* to use the gateway set on the WAN interface of the radio or select *Other* to set a different gateway address.

DNS

WAN-Assigned — Select to use the DNS server addresses as assigned on the WAN side.

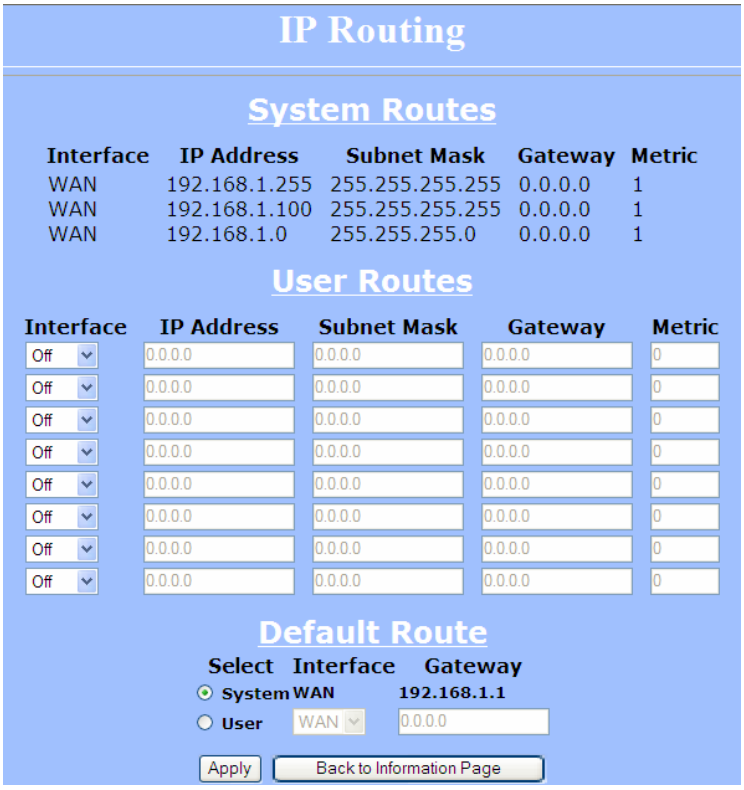
Static — Select to set DNS servers if different than those on the WAN side.

Note: If you select this option but leave the field blank or set to 0.0.0.0 the client will not get a DNS server value of 0.0.0.0. You must enter a value into this field to use a static DNS.

Domain Name and **WINS** operate the same as **DNS.**

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Static Routing Setup Screen



Routing is an incredibility complex topic that is way beyond the scope of a QuickStart or Manual. This screen is intended for those users who have a strong understanding of IP Routing. Misconfiguration on this screen could result in serious network problems or even the loss of functionality.

Menu Options

Static Routes—Adds a new route to the IP routing table.

System Routes—This section shows the current routing table entries.

Interface—Specifies whether the entry will be enabled or disabled, and what interface it should use transmit the packet.

IP Address—The IP address or network that the packets will be attempting to access

Subnet Mask—Used to specify which portion of the Destination IP signifies the network trying to be accessed and which part signifies the host that the packets will be routed to.
Note: 255.255.255.255 is used to signify only the host that was entered in the Destination IP field.

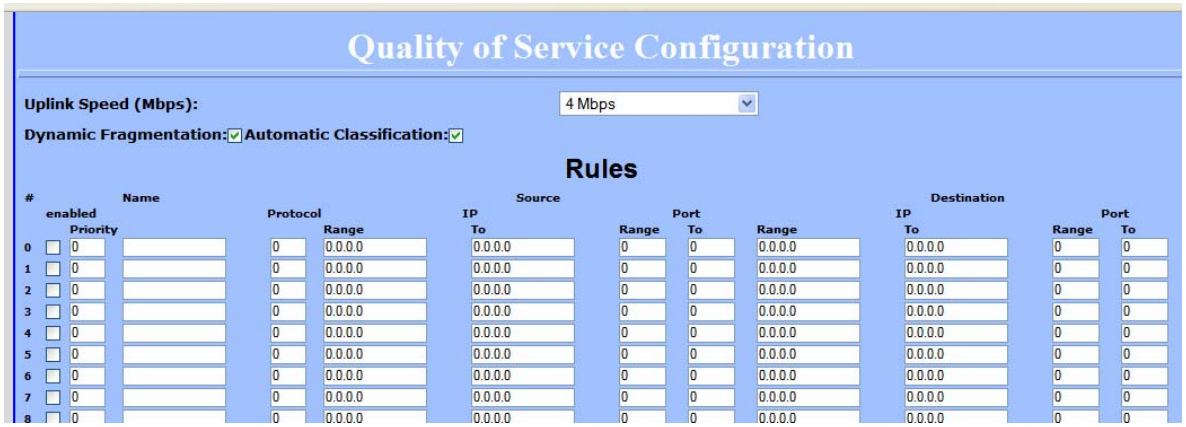
Gateway—Specifies the next hop to be taken if this route is used. A gateway of 0.0.0.0 implies there is no next hop, and the IP address matched is directly connected to the router on the interface specified:

Metric—The number of hops it will take to reach the Destination IP or network. A hop is considered to be traffic passing through a router from one network to another. If there is only one router between your network and the Destination network, then the Metric value would be 1.

Default Route—Allows the user to change the default route of the radio. **This option should be used with extreme caution.**

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

QOS



Menu Options

Uplink Speed (Mbps)
Sets the maximum total pipe size for this client. The order and traffic size is determined based on this value.

Dynamic Fragmentation Reduce delay for high-priority traffic and adaptive fragmentation where the fragmentation is determined by the uplink speed. This feature greatly improves the gaming and VOIP experience.

Automatic Classification
In vast majority of cases, this is all you need to select for best results. Applications such as VOIP, Gaming, etc are automatically given priority.

QOS RULES

If you chose to add you own rules, here are the various options:

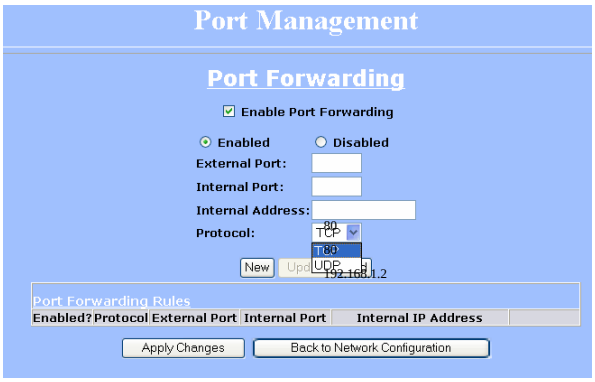
Enabled	You must select enabled to turn the rule on
Priority	The lower the number, the higher it priority. 0 is the highest priority and 255 in lowest.
Name	The name here is for your reference only.
Protocol	Enter the IP **Protocol Number** Common options are: 0 for ANY, 1 for ICMP, 6 for TCP, and 17 for UDP. See Appendix A – IP Protocol numbers.
Source IP Range	Enter the range of the IP Addresses on the LAN side that the rule should apply to Enter 0.0.0.0 to apply the rule to all LAN IPs, otherwise enter the highest and lowest IP. For a single IP enter the same IP in both boxes
Source Port Range	Enter the range of the Ports on the LAN side that the rule should apply to. Enter 0 to apply the rule to all Ports. For a single port enter the same port in both boxes
Destination IP Range	Enter the range of the IP Addresses on the WAN side that the rule should apply to.
Destination Port Range	Enter the range of the Ports that on the WAN side the rule should apply To.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Cloning MAC

❷This is a new feature. It allows the CPE the clone the MAC of the device behind it. This feature can be useful when dealing wth some PPPoE and Radius Implimentations. When the device is in Cloning MAC mode, it can only be managed from the LAN side of the device.

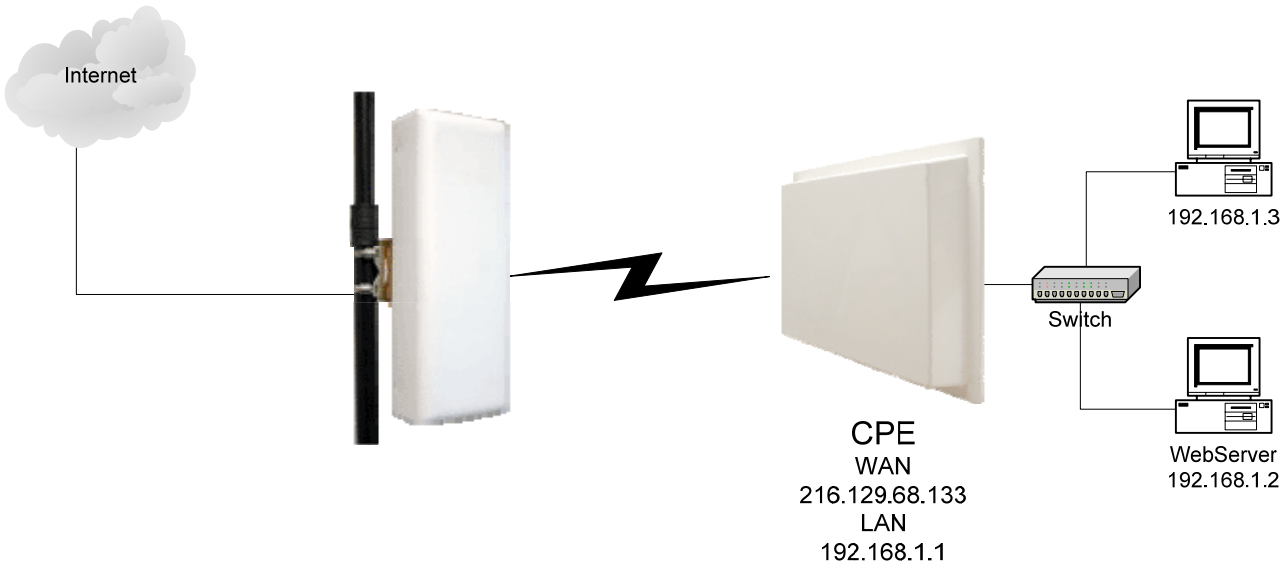
Port Management

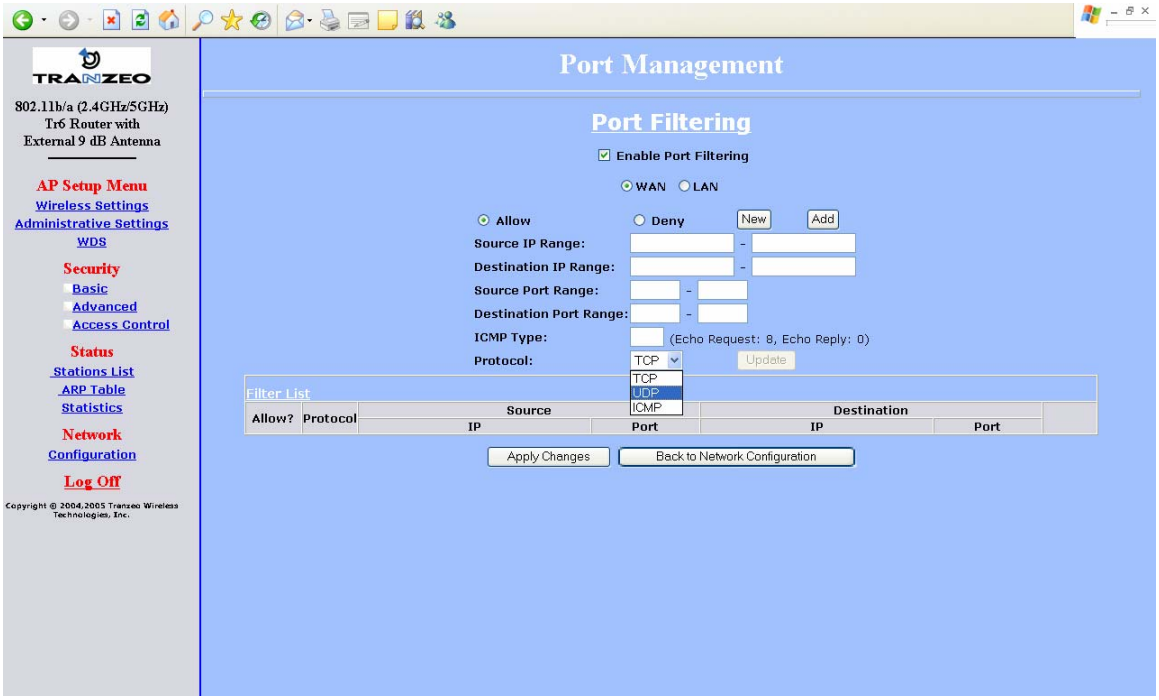


❷ Port Forwarding

This is a new feature. It allows the radio to forward requests for certain ports to devices behind the router. For example, the customer has a webserver behind the Radio on a Private Ip that they want to have accessable to the world, then you can port forward all requests on Port 80 to 192.168.1.2.

Note: In order for this example to work, the management port of the radio would have to changed from port 80 on the **Network Configuration** screen.





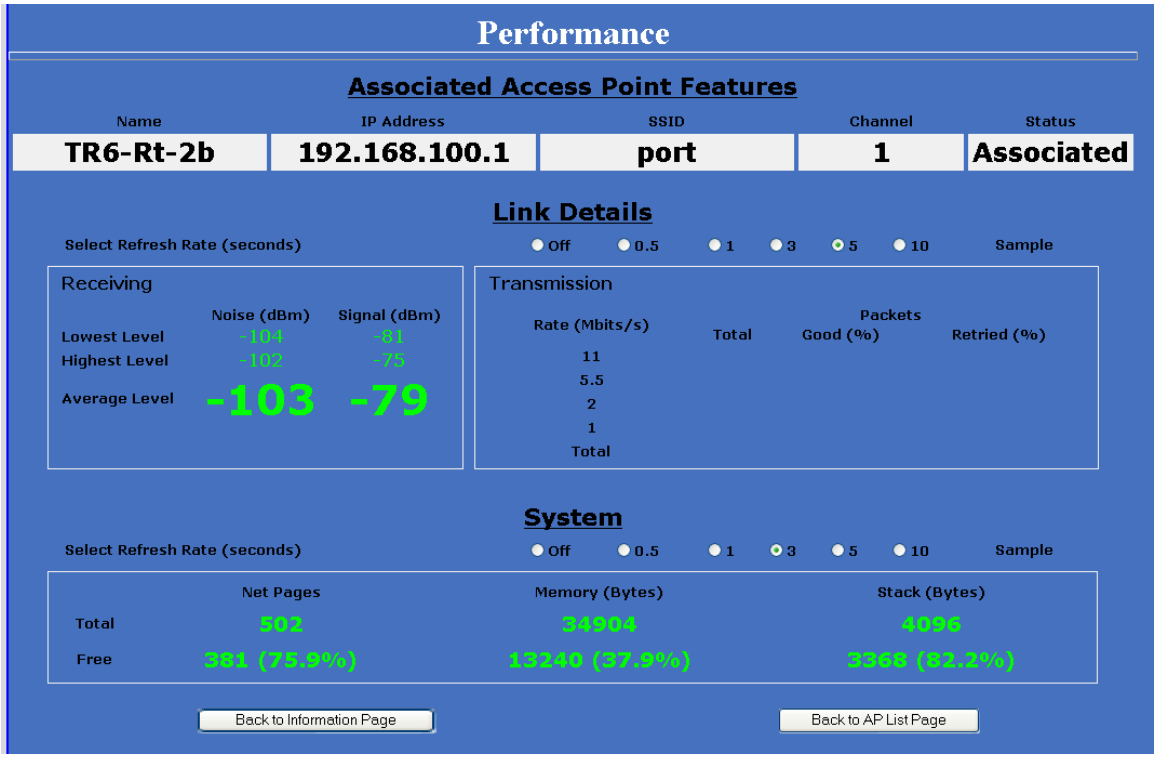
❷ Port Filtering

This is a new feature. It allows the radio to block requests for certain IP's or ports to and from devices behind the router. For example, if a customer wishes to block access to FTP from this network to the outside world, you would

1. Click **Add**
2. Select **Deny**
3. Select **Source IP Range**. Assuming that the clients are on 192.168.1.0/24, then the source IP would be 192.168.1.1 to 192.168.1.254
4. Select **Desintination IP Range**. Assuming that the entire outside world was to be blocked, then 0.0.0.0 should entered. 0.0.0.0 indictes all IP's
5. Select **Source Port Range.** In this case, enter 0 for all Ports
6. Ignore **ICMP type.** This field allows you to block certain types of ICMP as a prevention against port scanning and some viruses
7. Select the **Protocol.** In this case it would be TCP
8. You must click **Apply Changes** to save the rule

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

System Performance (CPE and PxP Modes only)



Select Refresh Rate
Each radio button represents a Refresh Rate. Many browsers do not allow infinite refreshes of a page through scripts, so this page may stop updating. If it does, simply change the Refresh rate to another value to restart the process.

Associated Access Point
Information about the access point is displayed here. Some items will only be displayed if the Access Point is a Tranzeo TR-6000 series series AP with the Extended Info turned on in the Administrative Settings Window.

❷Receiving
This box displays the current signal and the Lowest and Highest values. For the most accurate readings, data must be transmitted through the unit.

❷Transmission
This box displays the current signal traffic breakdown. For the most accurate readings, data must be transmitted through the unit. Beacons are always transmitted at the lowest possible rate. This screen only shows the values during the refresh rate. For more detailed statistics so the **Statistics** screen

❷System
This box displays the current Memory usage. It will fluctuate during normal usage. This data is mainly for the use of Tranzeo Wireless Technical Support.

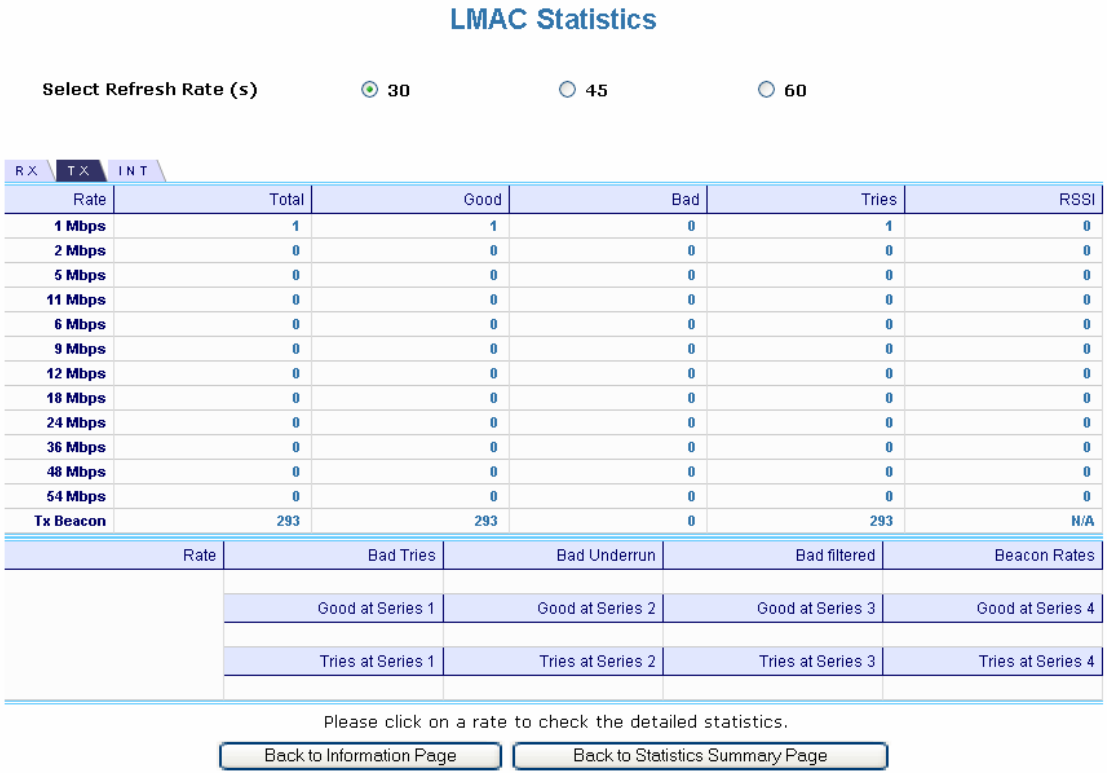
19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Statistics

The Statistics Screen is divided into 3 main areas, UMAC*, LMAC* and Ethernet. For Radio Troubleshooting, the UMAC statistics are likely the most useful. The UMAC breaks down the statistics into Good and Bad Packets, whereas LMAC defines why the packets are bad.

The statistics are further divided into TX, RX and INT. TX and RX values are useful to ISPs and other users. The INT (Internal) stats are intended for use by Tranzeo Wireless Technical Support.

* Technical Info:
UMAC or Upper MAC functions occur in the Unit's Processor.
LMAC or Lower MAC functions occur in the Radio Chipset.

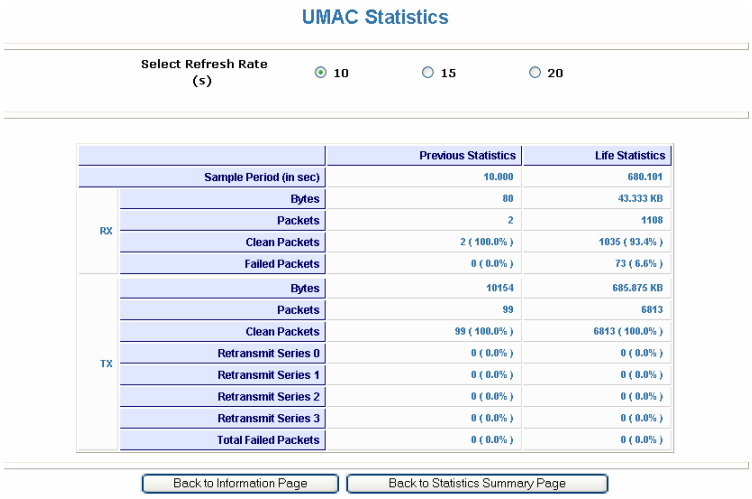


You can click onto each speed level and see how the traffic breaks down. In the TX statistics, there should little to no **Tries at Series 2, 3** or **4**. The radio will try to send a packet 4 times at **Series 1**, and then tries the next series 4 times. In the RX stats, you should look for Bad CRC's and Bad Decrypts for signs of RF interference or Fresnel interference links.

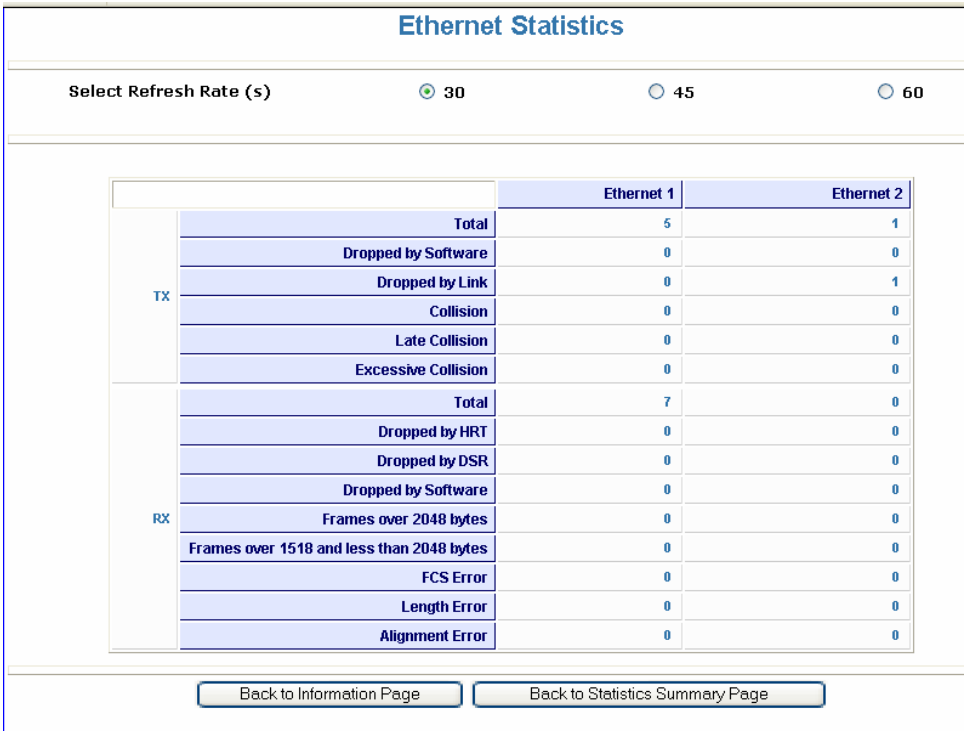
Bad PHY's generally are caused when the radio is unable to decode the packets due to noise.

Note: Communication between APs and Stations always occurs at the lowest rate. In a normal link you should see a fair number of transactions at the lowest rate.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com



The failed packets should be 1% or less in a normal operating environment. In the TX statistics, there should little to no **Retransmits at Series 2, 3** or **4**. Life Statistics are reset on each reboot.



In the Ethernet Statistics screen, excessive collisions are usually a sign that the radio and the device it is linked to are not on the same Duplex options. One is at full while the other is at half. Try locking both to the same values. Collisions do normally occur on an Ethernet network and are generally handled by the Carrier Sense Multiple Access with Collision Detect (CSMA/CD) mechanism.

Alignment, Length and Excessive FCS errors could the result of a Bad Radio Link, or a bad Ethernet cable.

APPENDIX A: Lightning Information

What is a proper Ground?

This antenna must be grounded to a proper Earth Ground.

According to the National Electrical Code Sections 810-15s and 810-21, the grounding conductor shall be connected to the NEAREST accessible locations of the following:

a) The building / structure grounding electrode
b) The grounded interior metal water piping system
c) The power service accessible means external to enclosure
d) The metallic power service raceway
e) The service equipment enclosure
f) The grounding electrode conductor

The important thing is to connect to ground at the nearest point.

Why is coiling the LMR or CAT5 bad?

The myth is that lighting follows the path of least resistance. It actually follows the path of least impedance. Coiling cables creates an air-wound transformer, which lowers the impedance. This means you are in fact making your radios a more appealing target for surges.

What standard does Tranzeo Wireless equipment meet?

This radio exceeds International Standard IEC 61000-4-5 when properly grounded. For a copy of the full testing report, see *Report Number TRL090904 - Tranzeo Surge Protection board* located on the Tranzeo website.

Is lightning damaged covered by the Warranty?

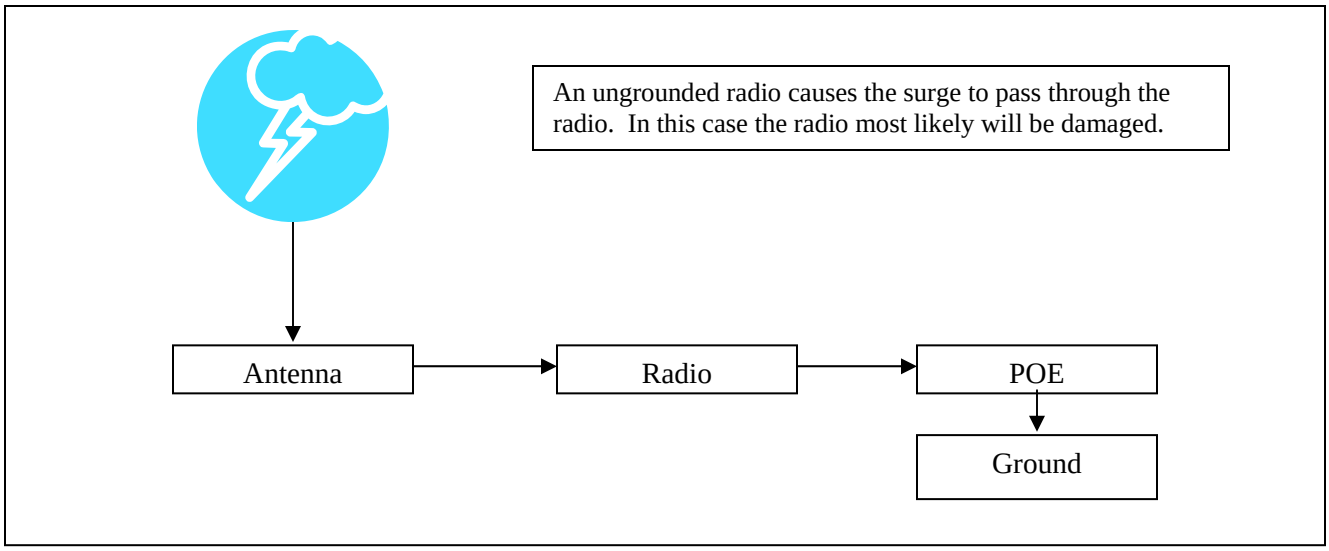
No. Lightning is not covered by the warranty. If you follow the instructions, you chances of lightning damage are greatly reduced, but nothing can protect a radio from a direct lightning strike.

Where to Ground the device

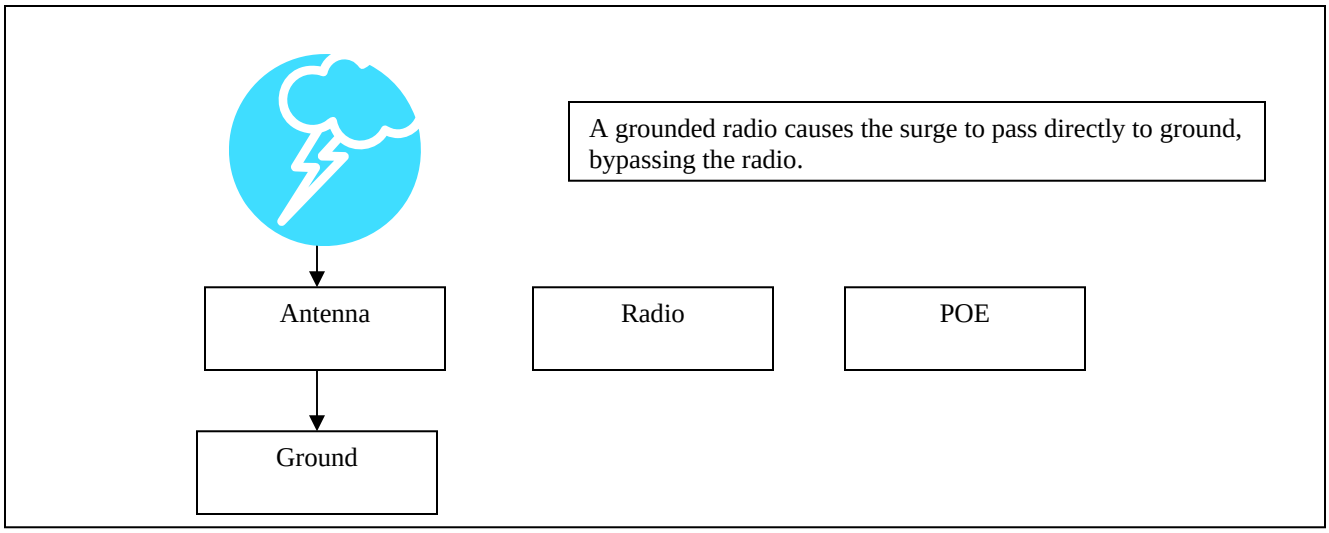
This radio must be grounded at the Pole **AND** at the POE. This is because the radio is between the Exterior Antenna and the POE ground. See the examples below

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

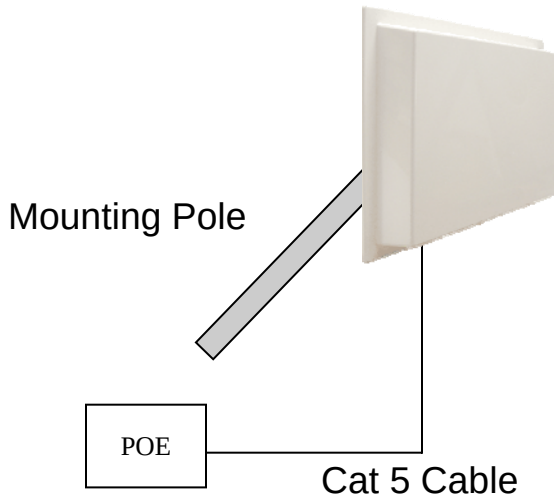
Ungrounded Radio



Grounded Radio

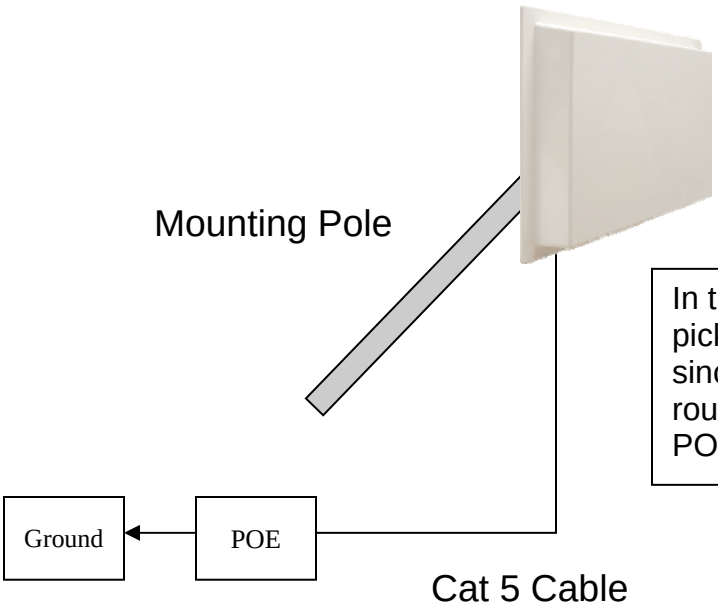


19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com



In this case, the surge will be picked up by the Cat 5 cable, and since the POE is not grounded, the route for the surge is through the radio to the antenna, and out through the building.

.

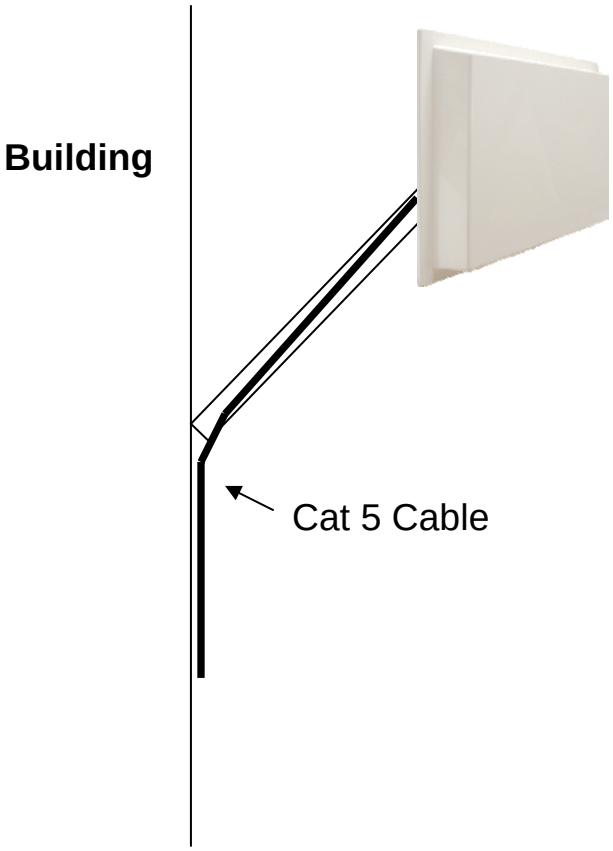


In this case, the surge will be picked up by the Cat 5 cable, and since the POE is grounded, the route for the surge is through the POE to ground.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Best Practices

1) Always try to run the Cat5 and LMR inside of the mounting pole wherever possible. This helps to insulate the cable from any air surges.



2) Keep all runs as straight as possible. Never put a loop into the cables.
3) Test all grounds to ensure that you are using a proper Ground. If using a electrical socket for Ground, use a socket tester, such as Radio Shack 22-141
4) Buy a copy of the National Electrical Code Guide and follow it.
5) If you are in doubt about the grounding at the location, drive your own rod and bond it to the house ground. At least you will know that one rod is correct in the system.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

APPENDIX B: QoS

QoS

Tranzeo Wireless Technologies' software takes full advantage of technology to ensure a consistently high quality on-line experience through the use of powerful Quality of Service (QoS) mechanisms. The key to making this applicable in a WISP environment is the Intelligent Stream Handling, a patent-pending algorithm which autonomously manages the flow of traffic going to the Internet, without the need for user configuration. As a result, real-time, interactive traffic, such as gaming, VoIP and video teleconferencing, are automatically given the appropriate priority when other users and applications use the connection. In addition, Intelligent Stream Handling minimizes the impact of large packet, lower priority traffic on latency-sensitive traffic and eliminates delays. Tranzeo Wireless Technologies' software effectively eliminates the lag and breakup problem in online gaming and other voice/video applications.

In today's broadband environment the impact of just one data stream running in parallel with a real-time application can be quite dramatic. Using NetIQ's Chariot VoIP test measurement over a connection, it can be demonstrated that introducing a single FTP transfer in the upstream direction will reduce the Mean Opinion Score (MOS) for a G.729 VoIP codec from a very good 4.4 to a completely unacceptable level of 1 immediately. Using the same scenario with Tranzeo Wireless Technologies' QOS enabled, the voice quality remains consistently high with an MOS of 4.4, and maintains that level even with multiple FTP streams.

- **Automatic Traffic Classification:** Tranzeo Wireless Technologies' software has the capability of continually monitoring and classifying traffic on the Internet connection, and dynamically adjusting the way individual streams are handled at any point in time. This enables latency-sensitive traffic, such as voice, games or even web page requests, to be given a relatively high priority. As a result, these packets are sent to their destination first, reducing delay and jitter. Less time-sensitive traffic such as email or file transfers are sent at lower priority. Since Intelligent Stream Handling operates automatically without the need for user configuration, it is able to effectively make use of 255 priority levels for fine-grained control of the packet streams.

- **Rate Matching:** A process called "rate matching" determines the bandwidth of the broadband uplink automatically so that it can shape the traffic to smooth the flow between the router and the Internet. This eliminates the potential bottlenecks and delays that can be caused by "bursty" data traffic.

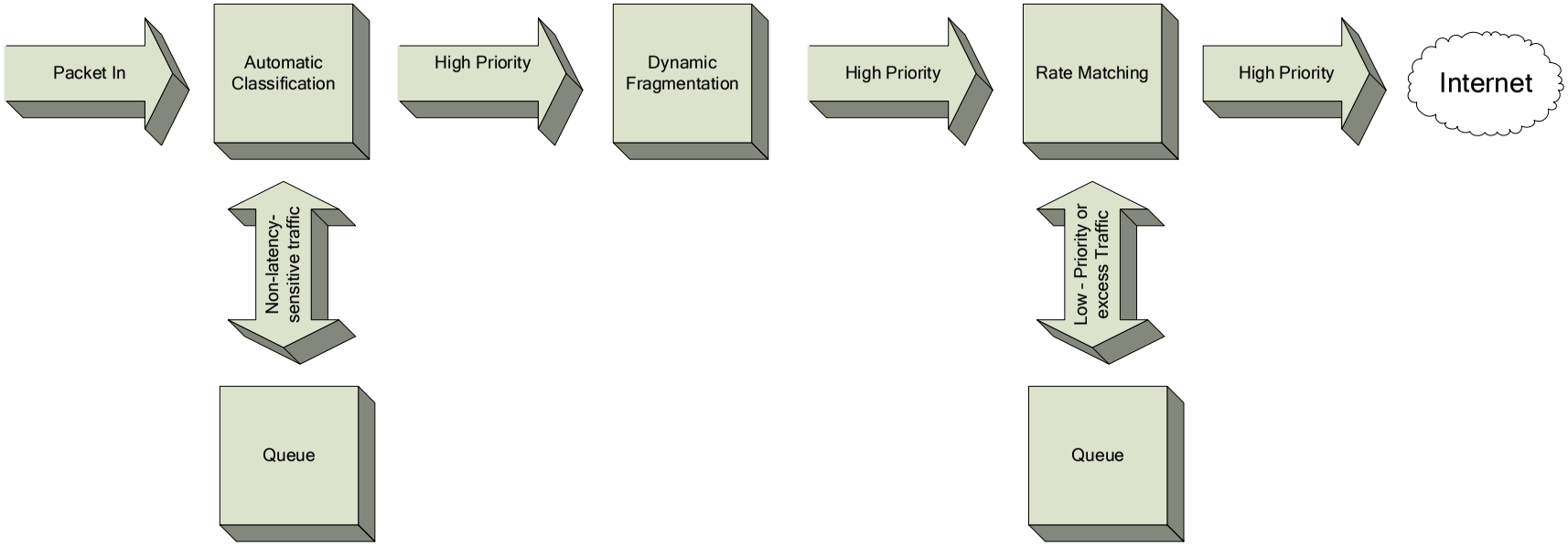
- **Dynamic and Adaptive Link Fragmentation:** Low priority traffic is also fragmented to reduce the latency and jitter that can be introduced by long packets. Intelligent Stream Handling adjusts the fragment size based on the uplink speed and also stops fragmenting long packets when no latency-sensitive traffic is waiting to be sent, to improve the overall efficiency of the broadband link and ensure voice can sustain a high MOS rating.

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Tranzeo's software has the capability of continually monitoring and classifying traffic on the Internet connection, and dynamically adjusting the way individual streams are handled at any point in time. This enables latency-sensitive traffic, such as voice, games or even web page requests, to be given a relatively high priority. As a result, they are sent to their destination first, reducing delay and jitter. Less time-sensitive traffic such as email or file transfers are de-prioritized.

Intelligent Stream Handling adjusts the fragment size based on the uplink speed and also stops fragmenting long packets when no latency-sensitive traffic is waiting to be sent, to improve the overall efficiency of the broadband link and ensure voice can sustain a high MOS* rating.

A process called "rate matching" determines the bandwidth of the broadband uplink automatically so that it can shape the traffic to smooth the flow between the router and the Internet. This eliminates the potential bottlenecks and delays that can be caused by "bursty" data traffic.

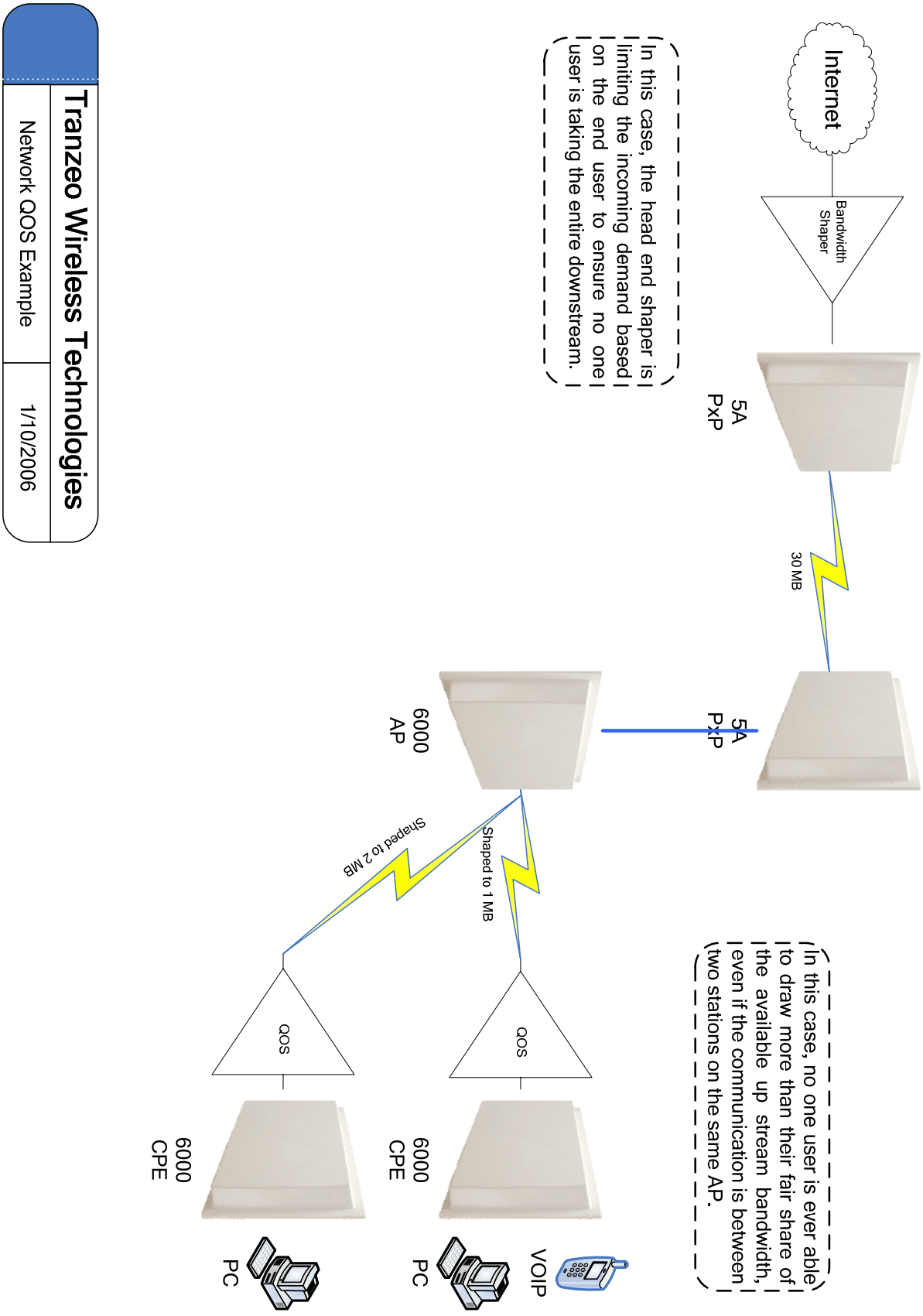


Tranzeo Wireless Technologies	
QOS Block Diagram	1/10/2006

*Mean Opinion Score (MOS)

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

This document is intended for Public Distribution



19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

Decimal	Keyword	Protocol
0	HOPOPT	IPv6 Hop-by-Hop Option
1	ICMP	Internet Control Message
2	IGMP	Internet Group Management
3	GGP	Gateway-to-Gateway
4	IP	IP in IP (encapsulation)
5	ST	Stream
6	TCP	Transmission Control
7	CBT	CBT
8	EGP	Exterior Gateway Protocol
9	IGP	private interior gateway
10	BRM	BBN RCC Monitoring
11	NVP-II	Network Voice Protocol
12	PUP	PUP
13	ARGUS	ARGUS
14	EMCON	EMCON
15	XNET	Cross Net Debugger
16	CHAOS	Chaos
17	UDP	User Datagram
18	MUX	Multiplexing
19	DCN-MEAS	DCN Measurement
20	HMP	Host Monitoring
21	PRM	Packet Radio Measurement
22	XNS-IDP	XEROX NS IDP
23	TRUNK-1	Trunk-1
24	TRUNK-2	Trunk-2
25	LEAF-1	Leaf-1
26	LEAF-2	Leaf-2
27	RDP	Reliable Data Protocol
28	IRTP	Internet Reliable Transaction
29	ISO-TP4	ISO Transport Class 4
30	NETBLT	Bulk Data Transfer
31	MFE-NSP	MFE Network Services
32	MERIT-INP	MERIT Internodal Protocol
33	SEP	Sequential Exchange
34	3PC	Third Party Connect
35	IDPR	Inter-Domain Policy Routing Protocol
36	XTP	XTP
37	DDP	Datagram Delivery
38	IDPR-CMTP	IDPR Control Message Transport Proto
39	TP++	TP++ Transport Protocol
40	IL	IL Transport Protocol
41	IPv6	Ipv6
42	SDRP	Source Demand Routing
43	IPv6-Route	Routing Header for IPv6
62	IPv6-Frag	Fragment Header for IPv6
45	IDRP	Inter-Domain Routing
46	RSVP	Reservation Protocol
47	GRE	General Routing Encapsulation
62	MHRP	Mobile Host Routing Protocol
49	BNA	BNA
50	ESP	Encap Security Payload for IPv6
51	AH	Authentication Header for IPv6
52	I-NLSP	Integrated Net Layer Security
53	SWIPE	IP with Encryption
54	NARP	NBMA Address Resolution
55	MOBILE	IP Mobility

Decimal	Keyword	Protocol
56	TLSP	Transport Layer Security using Kryptonet key management
57	SKIP	SKIP
58	IPv6-ICMP	ICMP for IPv6
59	IPv6-NoNxt	No Next Header for IPv6
60	IPv6-Opts	Destination Options for IPv6
61		any host internal protocol
62	CFTP	CFTP
63		any local network
64	SAT-EXPAK	SATNET and Backroom EXPAK
65	KRYPTOLAN	Kryptolan
66	RVD	MIT Remote Virtual Disk
67	IPPC	Internet Pluribus Packet Core
68		any distributed file system
69	SAT-MON	SATNET Monitoring
70	VISA	VISA Protocol
71	IPCV	Internet Packet Core Utility
72	CPNX	Computer Protocol Network Executive
73	CPHB	Computer Protocol Heart Beat
74	WSN	Wang Span Network
75	PVP	Packet Video Protocol
76	BR-SAT-MON	Backroom SATNET Monitoring
77	SUN-ND	SUN ND PROTOCOL-Temporary
78	WB-MON	WIDEBAND Monitoring
79	WB-EXPAK	WIDEBAND EXPAK
80	ISO-IP	ISO Internet Protocol
81	VMTP	VMTP
82	SECURE-VMTP	SECURE-VMTP
83	VINES	VINES
84	TTP	TTPord Protocol
85	NSFNET-IGP	NSFNET-IGP
86	DGP	Dissimilar Gateway Protocol
87	TCF	TCF
88	EIGRP	EIGRP
89	OSPFIGP	OSPFIGP
90	Sprite-RPC	Sprite RPC Protocol
91	LARP	Locus Address Resolution
92	MTP	Multicast Transport Protocol
93	AX.25	AX.25 Frames
94	IPIP	P-within-IP Encapsulation
95	MICP	Mobile Internetworking Control
96	SCC-SP	Semaphore Communications Sec.
97	ETHERIP	Ethernet-within-IP Encapsulation
98	ENCAP	Encapsulation Header
99		any private encryption scheme
100	GMTP	GMTP
101	IFMP	Ipsilon Flow Management
102	PNNI	PNNI over IP
103	PIM	Protocol Independent Multicast
104	ARIS	ARIS
105	SCPS	SCPS
106	QNX	QNX
107	A/N	Active Networks
108	IPComp	IP Payload Compression
109	SNP	Sitara Networks Protocol

19473 Fraser Way
Pitt Meadows, B.C. Canada V3Y 2V4
Phone (604) 460-6002 Fax (604) 460-6005
www.tranzeo.com

108	IPComp	IP Payload Compression
109	SNP	Sitara Networks Protocol
110	Compaq-Peer	Compaq Peer Protocol
112	VRRP	Virtual Router Redundancy
113	PGM	PGM Reliable Transport
114		any 0-hop protocol
115	L2TP	Layer Two Tunneling Protocol
116	DDX	D-II Data Exchange (DDX)
117	IATP	Interactive Agent Transfer
118	STP	Schedule Transfer Protocol
119	SRP	SpectraLink Radio Protocol
120	UTI	UTI
121	SMP	Simple Message Protocol
122	SM	SM
123	PTP	Performance Transparency
124	ISSIS	ISIS over IPv4
125	FIRE	
126	CRTP	Combat Radio Transport
127	CRUDP	Combat Radio User Datagram
128	SSCOPMCE	
129	IPLT	
130	SPS	Secure Packet Shield
131	PIPE	Private IP Encapsulation within IP
132	SCTP	Stream Control Transmission
133	FC	Fibre Channel
134-254		Unassigned
255	Reserved	

APPENDIX D: Common TCP Ports

See http://www.iana.org/assignments/port-numbers for a full list of Well Known Port Numbers.

Keyword	Port	Description
=======	====	==========
ECHO	7	Echo
SYSTAT	11	Active Users
QOTD	17	Quote of the day
MSP	18	Message Send Protocol
FTP-DATA	20	File Transfer (Data Channel)
FTP	21	File Transfer (Control)
TELNET	23	Telnet
SMTP	25	Simple Mail Transfer
NAME	42	TCP Nameserver
BOOTPS	67	Bootstrap Protocol Server
BOOTPC	68	Bootstrap Protocol Client
TFTP	69	Trivial File Transfer
WWW	80	World Wide Web
KERBEROS	88	Kerberos
POP3	110	TCP post office
NNTP	119	USENET
NFS	2049	Network File System
SIP	5060, 5061	SIP