ZipLine Ethernet

Quickstart Installation Manual

Version 1.03 – August 12, 2019

Statement of Conformity

Note: This equipment has been tested and found to comply with the limits for a Class A 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 commercial 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 communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Industry Canada license -exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Terminology:

Master – This is the radio that goes where you already have internet service or the main office.

Remote – This is the location where no network service currently exists.

Technical Support

Support can be obtained from your Teletics distributor, or by calling Teletics Technical Support at:

+1 587 351 1900

Safety Warnings for Grounding and RF exposure

In order to comply with electrical codes in most areas, as well as provide adequate protection from lightning, you MUST ground the ZipLine outdoor unit!

This device contains a low power radio transmitter. When this device is connected and transmitting, it sends out Radio Frequency (RF) signals.

This Wireless Radio device has been evaluated under FCC Bulletin OET 65C and found to be compliant to the requirements as set forth in CFR 47 Sections 2.1091, 2.1093, and 15.247(b)(4) addressing RF Exposure from radio frequency devices. The radiation output power of this wireless device is far below the FCC radio frequency exposure limits. Nevertheless, this device should be installed and used in such a manner that limits the potential for human exposure to distances greater than 20 cm or 8 inches from the device.

This device should not be installed within 10 meters / 30 feet of any other RF transmitter.

Contents

Introduction

The Teletics ZipLine Ethernet is a wireless system that provides an ethernet LAN (internet) connection to be quickly installed between two buildings or locations up to 1 mile / 1.6 kilometers apart.

The ZipLine Ethernet is designed to be easy to install. You will need the following tools:

- Power Drill / Screwdriver w/ Phillips bits
- 10mm nut driver / wrench
- Electrician's fishline

Box Contents

The Teletics ZipLine box contains the following:

- 2 ZipLine Ethernet Outdoor Radios, Master & Remote
- 2 power adapters and Power Injectors
- 2 Antenna Mounts
- Accessory Kit (White Box)

Cabling

Each ZipLine Ethernet radio comes equipped with 30 Meters / 100 feet of OUTDOOR RATED cable which runs from the ZipLine to the Power Injector, which is usually mounted in the customer's telco room. The cable is used for the data connections as well as power. YOU MAY SHORTEN THIS CABLE IF YOU WISH, BUT YOU MAY NOT LENGTHEN IT.

Keep in mind that this cable length maximum distance is due to the maximum length allowable for the power wires inside this cable only. The cable length FROM the Teletics power injector RJ45 connector TO the customers main internet connection or switch/router may be up to 300 feet in total using cat5e or cat6 for ethernet/data, or even greater distances when using shielded cables. This allows for almost any installation to use the ZipLine Ethernet system.

There is one black connector coming out of the ZipLine. This weatherproof connector is for the 4 pair Cat5e outdoor rated data cable that is included.

Each outdoor ZipLine radio should be electrically grounded by use of a ground lug installed on one of the bolts used to hold the ZipLine on the pole mount brackets and run to a proper electrical ground. This is not only a safety requirement for lightning dissipation purposes, but also improves system radio performance, since the enclosure provides radio shielding against unwanted radio and electrical noise on the Ethernet connection.

Assuming that the outlet which the Teletics Power Injectors power supply is properly installed according to electrical codes, no further grounding points in the system is required. The electrical circuits for the ethernet/data connections should NEVER be grounded. This includes all connections in the power injector. Ethernet connections must "float".

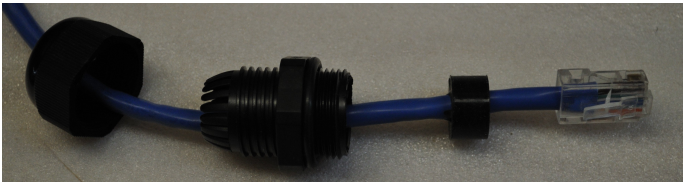
Cable Gland Assembly

Inside the accessory box that came with the ZipLine, you will find 2 black cable glands that look like this:

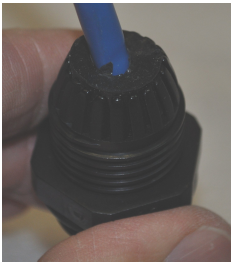
You should unscrew the two parts. You should leave the small rubber O-ring where it is.

You will notice that the O-ring has a slit in it. This is to allow the ethernet cable to be completely assembled on the ground, prior to installing it on the radio.

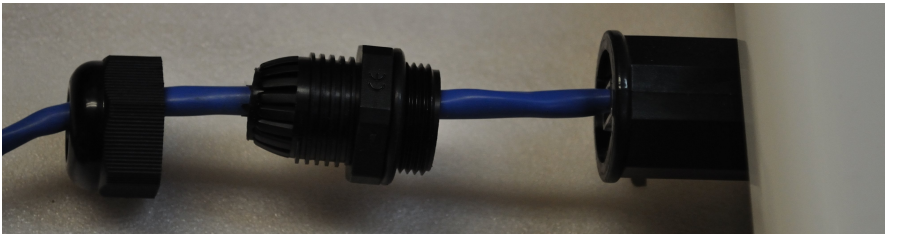
This is the order that everything goes together prior on the cable:



The next step is to push the rubber ring into position so that it will compress when the gland is assembled. You should GENTLY use a small screwdriver to slide it inside the main body of the gland housing until it is flush with the little plastic fingers at the bottom of the gland, like shown in the picture to the right->

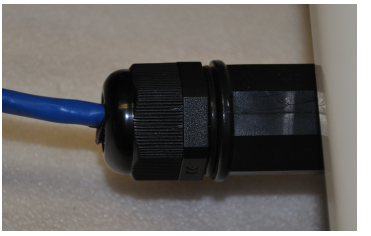


You can now slide the gland up and down the cable while you plug in the ethernet connector into the bottom of the radio:



Screw in the gland housing:

And then the bottom gland cap:



IMPORTANT!! – Hand tighten gland parts only - Do not use a wrench.

Bench Testing

When bench testing the ZipLine, you need to know the following:

- The minimum distance between the radios must be 25 feet or 8 meters. If you have the Master and Remote ZipLine closer together than this during testing, the system may not operate properly, especially for VoIP services testing.

- You should always orient the radios similarly to how they will be oriented when they are installed. Optionally, you may sit them BOTH sideways with the SKY arrow pointing at the same wall to facilitate easy RJ45 cable installation.

- Both units should be electrically grounded on their chassis to ensure noise from lights and motors in the vicinity do not affect signal quality.

- Generally, it is okay to put both ZipLine radios on the bench facing upwards and a few feet apart when testing. This will bring the signal strength down to a reasonable level.

- When using the ZipLine with devices with older Ethernet ports or vintage computers, you may need to be careful about the way that the Ethernet cables are wired between the injectors and the customer equipment in use. Some older Ethernet equipment will not automatically switch when the line connections are reversed. There are what are called "straight through" Ethernet cables, and "crossover" Ethernet cables. If the little LEDs on the equipment RJ45 ports do not light, you may need to use a different type of Ethernet cable.

Installation

Mount the ZipLine Radios as high up as possible on both buildings. The radios must "see" each other without obstructions between them, and since radio travels in a "football" shape between antennas, you must not only have a direct path between the antennas, but the path also must be wide enough, as determined by the distance between the radios:

Radio height required by distance between radios			
Distance (mi./km)	.25 / .40	.5 / .80	1 / 1.6
Minimum Height(ft/m)	10 / 3	14 / 4.3	19 / 6

For example, if you have two buildings a half mile apart, the ZipLine radios should be 14 feet above the ground, plus the height of anything else that is in between the buildings. So, if there are delivery trucks moving between the radios, they need to be 14 above the height of the trucks, so about 30 feet up. Same rule applies for trees, etc.

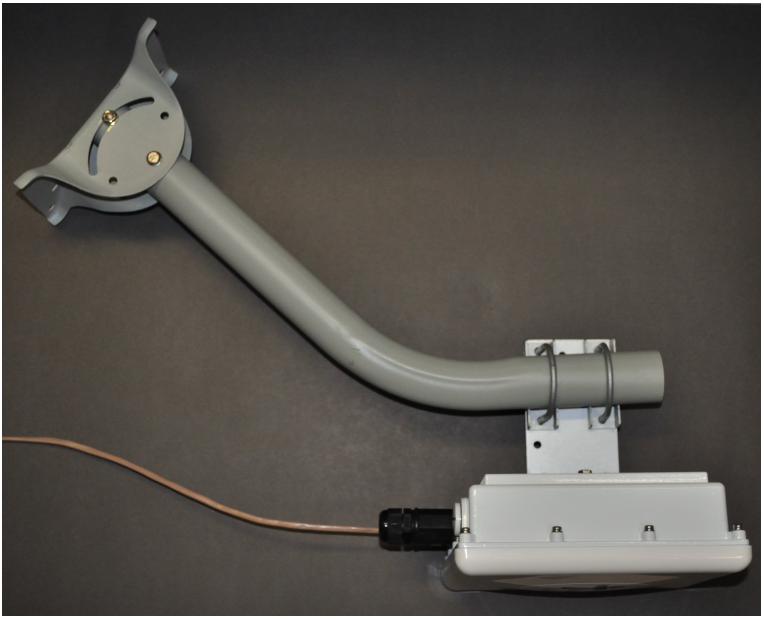
There are two ZipLine radios included in each kit. There is one **Master** unit and one **Remote** unit. **The Remote unit needs to be connected to the "remote" end. The Master unit needs to be connected to the main network switch or router at the "main" location.**

Assembly Tips

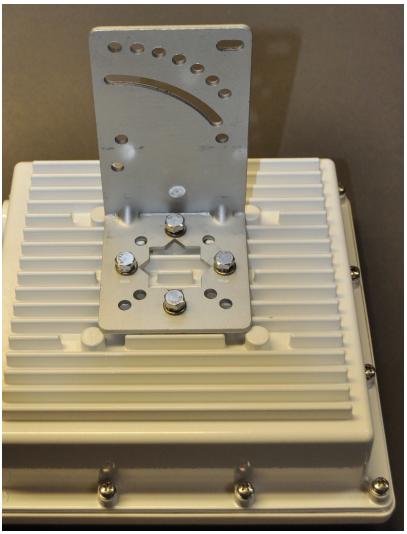
There are two of everything. Here are some basic set up tips:

- It **REALLY** matters what radio is at what end!!
- You can use any other component at either end of the installation. This includes the ZipLine Power Injectors

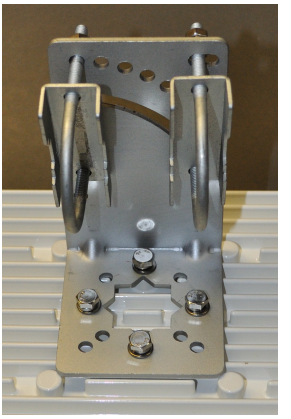
- Here is what each end will look like just before you install it:

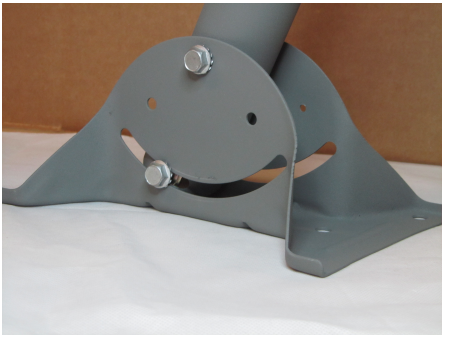


- First, attach the aluminum bracket to the back of the ZipLine. Use the 4 bolts, washers, and lock washers that are already on the back of the radio:



- Next, put the U-Bolts in place. These are also packaged in the Accessory Kit (the white box), and are wrapped in plastic wrap, along with washers and lock washers:

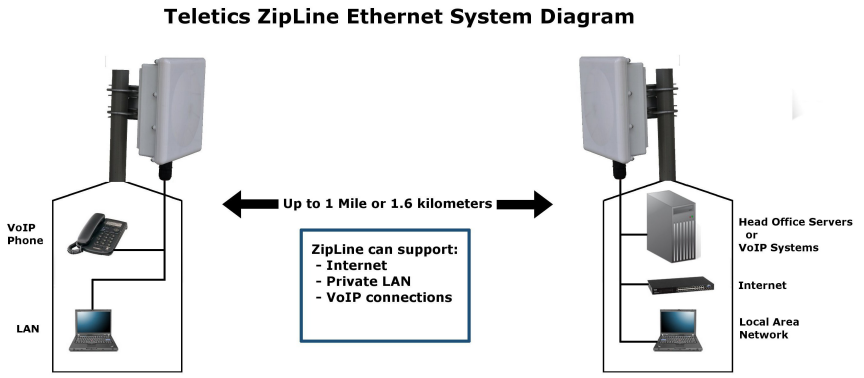




- The hardware for the pole mounts is included with the brackets themselves.
- Here is how you should put the pieces together prior to tightening anything:

Electrical Connections

Here is a diagram of all the components in the ZipLine kit, and how they hook together:



- The electrical connection between the power injectors and the wall adapters have not been shown for clarity. Here are what the power injectors look like:

  There are two RJ45 connectors on a power injector. Please ensure that the outdoor ZipLine Ethernet radio Ethernet cable gets plugged into the side that says "PoE". This stands for "Power over Ethernet", and is how the outdoor radio gets power. The other Ethernet connector goes to the cable to the customers laptop, Ethernet switch or equipment. The little

round barrel connector is where the power adapter gets plugged in.

- It does not matter the order in which the radios are powered up.
- The RJ45 connection performance is about the same as an office network LAN connection. It is suitable for email, internet access etc.
- The RJ-45 connection on the Master side may be plugged into an office router, etc. If the Phone/Remote RJ-45 connection is to be shared between computers, it is recommended that it is routed as well, to ensure LAN traffic between computers at the remote end does not go "over the air", thereby affecting the performance of the wireless LAN connection by relaying unnecessary LAN traffic.

Startup / Testing

Once the ZipLine Ethernet radios have been installed and aligned, you may test the system by plugging in a computer at the remote end and powering it up. It should behave exactly as if it was being used in the main location.

If you are using the RJ45 data connection as well, you should be able to use your computer in exactly the same way you would at the other end.

A good check is to get internet access on a laptop at the Master location end, and simply move the laptop across to the Remote end location and plug it in. If everything works the same, you are done. If you need additional tips, see the "Basic Troubleshooting" section, below.

Signal Strength

If you have a laptop, and want to access the internal signal strength utility inside the ZipLine Ethernet, you can do so by opening up a browser

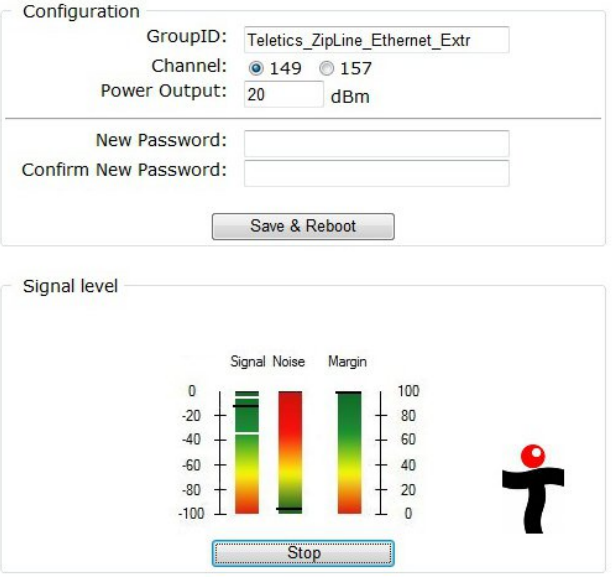
window (Internet Explorer, or Firefox) and enter in one of the following IP addresses in the browser address bar (where you usually enter a website address):

Enter this if you are at the Master → http://169.254.4.11

Enter this if you are at the Remote → http://169.254.2.11

You should see this login screen:

Enter in the user name of "admin" and the password "teletics". You should now see the setup/signal strength screen:



If you want to see signal strength, click on the START button underneath the colored signal strength indicator. You will then see a black signal strength indicator appear on each of the three gradient color bars, like in the example screen shot.

Degraded performance will occur from a Power Output setting that is too high! Default factory setting is for 1 mile distance between radios. Try 5 or 10 for shorter distances between radios.

What the Numbers Mean

A good signal strength is somewhere between -20 and -60. The ZipLine Ethernet will perform well at distances up to 1 mile or 1.6 kilometers. If you have the two ends rather close (say a few hundred yards or less), you should reduce the output power on both radios, so you should log into the remote end and change power output and reboot, then do the same for the master.

A good installation will allow you to get minimum actual data speeds of 25 Mbps, which would allow you to transfer a file of about 100 MB in about a minute and a half.

The Noise indicator show is there are any other 5.8 GHz equipment operating in the area. Since the antennas of the ZipLine Ethernet are very directional, you most likely will not see any noise even if other equipment is operating in the area. However, a number of higher than -60 in this display may indicate an interference source is in the area. This may not affect the system if you are using it for networking only, but interference may create problems for VOIP voice communications over the ZipLine connection.

The Margin display is the mathematical difference between Signal and Noise.

Startup / Testing

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If you are using the RJ45 data connection as well, you should be able to use your computer in exactly the same way you would at the other end.

A good check is to get internet access on a laptop at the Master location end, and simply move the laptop across to the Remote end location and plug it in. If everything works the same, you are done. If you need additional tips, see the "Basic Troubleshooting" section, below.

Basic Troubleshooting

- With Ethernet cables plugged in, you should always get at least one LED to light up on the Ethernet ports you have equipment plugged into. If you do not see any LEDs that light up when you plug in the Ethernet cable, either the ZipLine Ethernet outside unit is not getting power, or you have a cabling problem.

- TUtil ZipLine 58 software is a program that will assist with the installation and configuration settings of the ZipLine system. The software and manual may be downloaded from the Support section of the Teletics website www.teletics.com/support, or through contacting Teletics Technical Support. There is no charge for this software.

- If you are experiencing any kind of stuttering, sporadic service, or general bad voice quality during a VoIP phone call, this may indicate that one of the outdoor units has not been properly grounded. You need to ground the outside chassis of the outdoor units in order to ensure a suitable path to ground, both in the case of a lightning strike, and to reduce spurious radio noise.

- Grounding – The ZipLine is considered to be a low voltage device, and therefore usually may be installed by anyone without need for permits or inspections. However, you need to make certain the outside case is grounded for lightning reasons, and you should consult your local electrical / safety codes in your area prior to performing any kind of permanent equipment installation.

- It is important to understand that each ZipLine system is programmed to ONLY talk to itself. If you have two

ZipLine systems, you cannot mix and match Remote and Master units.

- If you are experiencing unclear voice or data performance problems, there is a possibility that the ZipLine is getting interference from another wireless network near the site. To check if this is the case download (no charge) and install on a laptop computer a program called inSSIDer from the following link: http://www.metageek.net/products/inssider/ If you need assistance, you may contact your local reseller, distributor, or Teletics technical support directly by contacting your regional technical support center, listed on the Teletics website under Support.

- Should you wish to remove the original ZipLine sticker from the front of the outdoor unit, and replace it with something else, please ensure that anything installed on the front of the ZipLine radio allows high frequency radio to pass through. You cannot use labels that have any kind of metallic based inks, or a foil label without harming the ZipLine, or seriously degrading its performance.

- If you decide to make your own Ethernet cables, it cannot be stressed enough that there are two industry standards for terminating Ethernet cabling. TIA-568A and TIA-568B. The ZipLine doesn't care which you use, but you must decide on which one and crimp all of your Ethernet connectors the same way.

- Running pin 1 to pin 1, pin 2 to pin 2, etc. between the two Ethernet cable ends without using the TIA-568 A or B wiring standard will cause your Ethernet connection to either be very slow, or not work at all.

Warranty

Teletics warrants the ZipLine system for one year from date of purchase by the original owner.

Teletics will replace or repair, at its option, any ZipLine system that fails to perform under normal use, provided that the system is returned, at the cost of the owner, to Teletics. Items that are returned for warranty repair must be accompanied by a copy of the original invoice or proof of purchase. For further details about how to receive warranty or after warranty service information, please contact your Teletics distributor, or visit the Teletics website at www.teletics.com

Any operation of the ZipLine outside of specified temperatures, power, environment, or in a manner specified in this manual as harmful to the device will void any warranty. Additionally, any attempted repair or dismantling of any Teletics product, in any way, will void all warranties.

In no event shall Teletics liability exceed the original purchase price of the product from direct, indirect, special, incidental, or consequential damages resulting from the use, or misuse, of this product.

Disclaimer

Installation of this equipment must be in strict accordance with the instructions included in this documentation.

Any changes or modifications made to this device that is not expressly approved by Teletics may void the user's authority to operate the equipment.

Specifications

Radio Range		1 Mile / 1.6 km
Ethernet Port		RJ45 / 10BT equivalent
Ethernet Speed Port		10BT/110BT
Over the air data rate		12Mbps
Operating Temperature	(U.S. Version)	-30F to +145F
	(Canada)	-40C to +50C
Power Required		7W, (US) / 17W (Canada)
Radio Type		5.8 GHz DSSS, License Free
Encryption		256 Bit WPA-PSK (AES)
Radio Power		+34 dBm
Radio Sensitivity		-89 dBm @ 10^{-5} BER
Outdoor Unit Size		9" x 9" x 3.5"
		(23cm x 23cm x 9cm)
System Shipping Weight		23 lbs / 10.5 kg
Shipping Dimensions		24" x 11" x 8.75"
		(61cm x 28 cm x 22 cm)