

Teletics

## *The String*

# Wireless Line Sharing System

## Installation and User Guide

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## Introduction

**The String** is a wireless line sharing system designed for two different uses. First, **the String** can provide a wireless telephone service between up to 19 phones in different temporary buildings or structures, and the ability to share one outside phone line. Second, in power metering and telemetry applications where a number of devices with modems are within a 10 mile range of each other, **The String** allows one phone line to be shared between up to 19 modems. Polling data gathering systems that dial into the one **LINE** unit are given a second dial tone which allows another 2 digit dialing sequence from 12 through 31, providing a line sharing function for access to up to 19 devices within radio range.

Additionally, the devices that are connected to the **Phone 12** through **Phone 31** radios can dial out on a line sharing basis by dialing “9” followed by the number they wish to dial. Additionally, any **Phone** unit can also call any other **Phone** unit within the system, by dialing its two digit extension.

**The String** can be used to connect to a regular POTS telephone line, or connected to other communications systems that provide “backhaul” to the outside world, such as satellite communications, or cellular backhaul links.

**The String** key features:

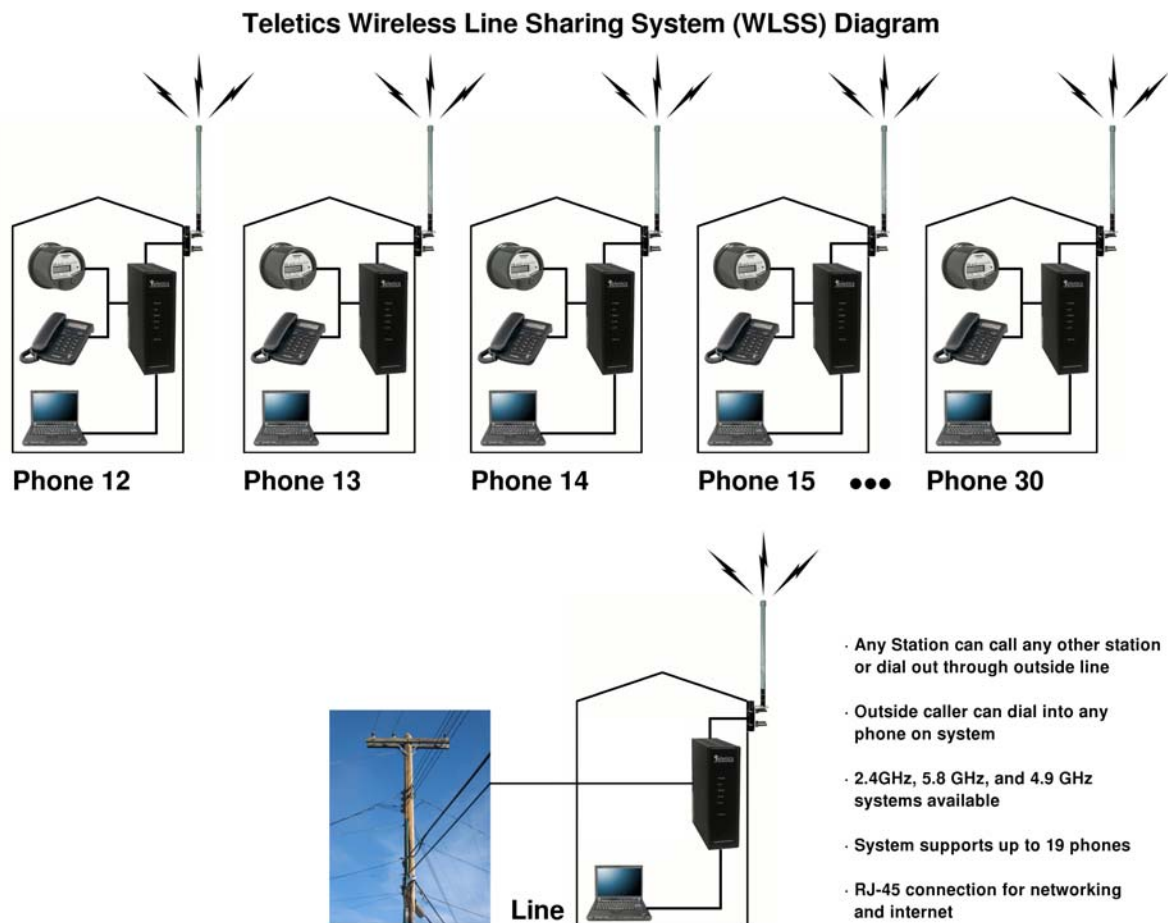
- Up to 19 phones can be supported on each radio channel.
- 3 non-overlapping radio channels available.
- There is no limit to the number of calls that can occur simultaneously between units on **The String** system. The **LINE** is the only shared resource.
- Each system may be programmed with a unique system serial number, in order to prevent similar systems being operated close together from communicating with each other.
- Call Display feature is standard.
- +12VDC operation.
- 2.4 GHz, 5.8 GHz or 4.9 GHz Public Safety Band models available.
- Simple programming using Teletics TUtil programming software.
- Encrypted, spread spectrum radio technology provides security.
- Units can be added, removed, or moved from any system to another system with TUtil programming software.

## Using The String

### Overview

Once **The String** is installed, any phone can call any other phone, and any computers connected to **The String** can communicate with each other, or out to the internet if an internet connection is provided at **The String LINE**. Any **Phone** unit can dial out through the **LINE** unit by prefixing the number it wishes to call with a "9".

If an outside caller calls the **LINE** unit, they are given a second dial tone. Once they hear the second dial tone, they may dial any number between 12 and 30 to call through to the appropriate **Phone** unit.



## Telephone to Telephone

If you want to call another phone on the system, you simply pick up a phone on the system and dial the two digit extension of the person you wish to call. **The String** extensions are two digits, numbered from 12 to 30. If you are at **Phone** 15, and you wish to call **Phone** 20, you simply pick up your phone and dial 20. You will hear a few seconds silence, then the familiar ringing tone when the phone starts to ring at the other end.

## Outbound / Inbound Calling

The outside line can be accessed through adding a 9 digit at the beginning of the number being dialed. For instance, if you wish to dial (713) 555-1212, you would pick up your phone and dial 97135551212. Notice that you do NOT dial 9 and then wait for a second dial tone. You need to enter the phone number completely, including the leading 9 digit all at one time.

Outside line access is “first come, first served”, and if the line is in use, the second party attempting to use it will get a busy signal until the first party finishes using it.

Inbound callers will receive a second dial tone. When they hear the second dial tone, they can enter the 2 digit extension of the phone they want to reach and the call is “transferred” to that phone.

## Data Connections

Each **The String** unit has an Ethernet port for use with a computer. All **The String** units in a system act as a common hub, sharing the available bandwidth on the system. If there are units that should have their Ethernet ports disabled, you can do so with the TUtil programming software. Please refer to the TUtil programming software manual for details. During factory programming, the Ethernet port is left active and ready for use “right out of the box”.

The Ethernet connection provided by **The String** is completely transparent to anything else being sent over the network. You should simply treat it as a “wireless wire”. The data speed for **The String** is 12 Mbps. This is similar to standard office Ethernet speeds on 10BT Ethernet, and this connection is always faster than the internet connection backhaul provided by satellite or cellular that is provided to most sites.

## Modem Polling

When an outside caller calls into the system by calling the **LINE** unit, they are simply given a second dial tone, at which point they must dial the two digit extension of the **Phone** unit they wish to reach. If **The String** is being used with Modems, the Modem setting must be used when programming each **The String** radio with TUtil software.

**The String** supports either Modem devices or standard phones. This a system wide setting for **The String**, meaning that one installation cannot have a mixture of phones and modems in one system.

## Recommended Accessories, Cabling and Antennas

The number one support issue we encounter is with choices of antennas, cabling, and proper installation practices. One area that is critical to a successful installation is for the installer to seal all RF connectors to prevent water getting inside the RF connectors. Understanding the type of antenna required for the installation is critical to a successful installation.

Teletics recommends a good quality RF cable capable of 6GHz or better operation, with losses of less than 10dB per hundred feet. Many of our installations have only 3 dB cable loss between **The String** radio and antenna. Our customers have had great success with LMR-400 and LMR-400 ultraflex in colder climates, on sites with less than 25 feet of cable between **The String** radio and the outdoor antenna.

Another common failure is custom RF cables with cheap connectors, badly installed connectors, or cable assemblies that are not swept to ensure proper operation at the frequencies which **The String** radio operates. It is highly recommended that any custom RF cables purchased or used with any Teletics equipment is tested at the frequency it will be used with, either 2.4 GHz or 5.8 GHz operation.

A qualified RF designer can quickly determine cable and antenna types for a good quality link. When in doubt, our Teletics distributors can assist you with antenna and cable selection.

Once again, we would like to emphasize that in all cases, a self fusing rubber tape should be applied to all RF connectors exposed to the elements, as well as proper “drip loops” need to be installed where the cable enters the trailer or building wall.

## Connections

The **String Phone** unit back connector panel looks like this:



Connectors are (Left to Right):

**ANTENNA** is for use with an external antenna and RF cable rated for 5.8GHz operation. Please contact your Teletics distributor for antenna and RF cable assemblies made to your requirements.

**DATA** (RJ-45) is for connection to either a computer or a computer network. The DATA ports on **The String** system act like a computer hub. There is no routing between them, and each unit has equal priority. This port does automatic Ethernet cable detection, so it does not matter if the Ethernet cable you are using is a “straight thru” or “crossover” type of cable.

**PHONE** (RJ-11) is where the phone plugs in. Any standard phone capable of being used on a POTS line (like your phone at home) may be used with **The String**. Additionally, this PHONE jack can be wired in parallel with a number of third party ringing devices, such as horn relays, or to multiple phones.

**+12VDC** is for providing power to the unit. If you look closely, you will notice that the pins inside this connector are numbered. +12VDC is required on pin 4, and ground is pin 1. Although the power consumption of the unit is 8W, it is highly recommended to use at least a 2A power supply, similar to the power adapter provided by Teletics. If you are using a power supply other than the unit supplied by Teletics, it is strongly recommended that you use a commercial grade switching power supply suitable for the power situations that the unit might encounter and having a 2A current rating.

**LINE** units have a beige colored **LINE** RJ-11 connector in place of the **PHONE** connector. Otherwise, the connections are identical to a **Phone** unit. The **LINE** connector should be connected to a standard telephone (POTS) LINE, or to other communications equipment that provide an analog phone line plug. Examples include FXO ports on VSAT terminals, or interfaces that allow the use of a standard phone with cellular phones or two way radio systems.

## Installation

**The String** is architected to be a “star topology”. In each system, there needs to be one **LINE** radio and up to 19 **Phone** radios numbered **Phone 12** through **Phone 30**.

Each **The String Phone** radio needs to have radio line of sight to the **The String LINE** radio.

**The String Phone** radios do not have to have RF line of sight to each other, only **The String LINE** radio.

Here is a typical connection scenario:

An electrical utility would like to have one phone line installed in a location where it can reach 7 electrical meters so that their billing system can poll all 7 meters from the one phone line, saving the costs of 6 additional monthly phone line charges.

This system requires the following equipment:

7 **The String Phone** radios

1 **The String LINE** radio

TUtil Programming Software

For this system to correctly operate, you will need to program one **The String LINE** unit as **LINE**, with the same **Group ID** used to program all of the **Phone** units. The **Phone** units can be programmed as any number from 12 through 30 however you cannot have two **The String** units with the same number in one system.

Each **The String** unit has its own serial number that is assigned at the factory. This is on the label of each unit. Additionally, the TUtil programming software allows you to set a **Group ID** as well, which is a common identity code which is used to group units into one system together. The **Group ID** can be any alpha numeric sequence you would like, up to 10 characters or numbers.

When **The String** systems leave the factory, they are tested and shipped as a working system with one **LINE** and 4 **Phones**. They are numbered **LINE**, 12, 13, 14, and 15, and the **Group ID** for the system is the same as the serial number for the **LINE** unit.

For example, let's assume that we have a brand new **The String** system in its box in our shop, and we have two additional "loose" units. For our example I will assume that they have the following serial numbers:

	Unit	Serial Number	Group ID
Complete System:	LINE	0805-0360	0805-0360
	Phone 12	0805-0361	0805-0360
	Phone 13	0805-0362	0805-0360
	Phone 14	0805-0363	0805-0360
	Phone 15	0805-0364	0805-0360
Loose Units:	Phone 12	0802-0301	unknown
	Phone 14	0802-0303	unknown

Therefore, the fastest way to program our example system is to program the loose units to Phone 16 and Phone 17 using TUtil, using the **Group ID** of the new, complete system, which is 0805-0360.

One other way to accomplish the same thing is to reprogram all of the units using a serial number of your choice, such as A1B2C3D4, or SITE4567.

Keep in mind that all serial numbers are case sensitive!

Once you have **The String** units programmed, it is a good idea to test them as a system to ensure that each unit can call the other units in the system. Once you have antennas and phones connected to each unit, you should apply power to all of them. You can refer to the "Powering Up" section on what the LEDs on the front panel mean.

Finally, once the complete system is working on a phone to phone basis, you can then test the functionality of the outside phone line, by dialing in and out of the system. Remember that outbound calls use single stage dialing, ie. Dial the entire number, including the leading 9 all at once. Also remember that upon dialing in, you simply receive another dial tone and you then have to dial the two digit number of the phone you want to call through the system to reach.

## Obtaining Teletics TUtil Software

The TUtil programming software can be downloaded from the Teletics website. Here is how you do this:

### Obtaining / Installing Teletics TUtil software for **The String**:

1. To assist you in deciding which computer you would like to load TUtil on at your shop, you should be aware that TUtil performs best on a dedicated desktop computer with one Ethernet port and Windows XP Professional, Service Pack 2 or higher. It can run on machines as slow as 1GHz effectively. It is often better just to put an older (but reliable) computer on the bench and dedicate it to running TUtil. However, you can still run it on a new laptop, assuming you follow the following setup procedure:
2. Laptop setup:
  - a. Ensure that the laptop that you are using is not putting the Ethernet port to sleep as a power saving feature. If the Ethernet port goes to sleep during programming, it will cause TUtil to hang.
  - b. In rare cases, it is necessary to turn off the automatic cable detection feature in the Laptop chipset's drivers. The Ethernet port on the **The String** have this feature turned on, and occasionally **The String** radio and laptop will both attempt to switch back and forth and neither will ever settle on the correct setting.
3. Once you have a computer ready, preferably with Windows XP Service Pack 2 installed, you should obtain the software by doing the following:
  - a. Open up "My Documents" in windows.
  - b. Enter <ftp://teletics.com> in the address bar. Press the enter key, or hit the "go" button.
  - c. You will be asked for a User Name and Password. You will need to either get these from your distributor, or directly from Teletics technical support. The reason that we do not give out the User Name and password in this manual is to ensure that you download the correct version of the TUtil software for your equipment.
  - d. Once you have entered in the correct User Name and Password, you can obtain a manual about how to download and install TUtil under the Manuals folder, and then the correct version of TUtil in the Software folder.
  - e. Complete installation and use instructions for TUtil are in the TUtil manual.

## Powering up

Once all **The String** units are connected to antennas, speakers, phones and computers, you can power them up. You can power the radios in the system up in any order. Additionally, even if any unit is accidentally powered down, it will return to normal operation once it is powered back on and has time to completely initialize. There is never a requirement to power up units in a particular order. This is a feature of the system design, since most remote work environments have generated power that tends to be intermittent.

In most cases, it is prudent to use some sort of power conditioning product in line with the power adapter for **The String**. A good quality power bar that has an equipment replacement guarantee is generally a good investment, and can be used to protect the other equipment already at the site.



Warning !! – Possible Damage to Equipment !!

Powering up **The String** without having an antenna connected will damage it! You **MUST** connect an antenna to the unit before powering it up!

**The String** units have a number of LEDs on the front panel:

**Power** indicates power has been applied to the unit.

**LAN** indicates that there is an active **LAN** connection to the unit, ie. There is a computer connected and it is on. This is the status of the physical connection. It does not indicate that there is an active internet connection. In fact, if **The String** has been programmed to have the **LAN** Port disabled, this LED will still turn on. It simply means the wiring is correct. If there is no computer connected to the **LAN** port, this LED will not be on. **The String** may still be used for phone operation in this state, ie., this LED does not need to be on for phone calls to operate.

**Radio** indicates that the Radio section of the unit is powered up and appears to be working. If the **Radio** LED is not on, **The String** will not work properly in a system. You should check that the unit has been properly programmed. If programming does not make this LED turn on, you should assume that **The String** needs servicing.

**Error** will come on during power up, but should turn off about 15 seconds after power is applied. If the **Error** LED stays on during



normal operation, it might be an indication of the program settings having been lost due to an indirect lightning strike presented through the LINE interface, the antenna, or the power system and you should first attempt to reprogram it. If the Error LED comes on longer than 30 seconds after power up and after being freshly programmed, the unit must be returned to a Teletics Service Centre.

**LINE** indicates that **The String LINE** unit is in the process of making a call or receiving a call through the phone line it is connected to. The best way to think of this LED is to assume that if it lights up, the system is trying to process your call.

**Phone** indicates that the phone attached to **The String** unit has gone “off hook”. This shows you that the phone is correctly attached to the **The String** unit.

## Instructions for Use

Once all **The String** units have power applied, and they have had about a half minute to initialize, you may pick up any phone in the system and dial any other phone in the system.

The system allows as many simultaneous phone conversations as there are phones. For example, if you have 6 phones on the system, you can have 3 phone conversations going on at once.

**Phone** numbers range from 12 to 30. If you attempt to call a phone that isn't in the system, you will receive a busy signal back in about 45 seconds.

The outside line can be reached using a leading “9” along with the number. Keep in mind that if the outside line you are using also requires a “9” to get an outside line, you will need to dial another “9” as “99” before the actual number, since the **LINE** unit strips off the first “9” and then dials the number. The user would have to dial 997135551212, for example. If the outside line is “straight out”, then 97135551212 would be correct. In all cases, all the **LINE** unit does is strip off the first 9 and then send the remainder of the dial string through. So, if you are attached to a PBX, you could also call a 4 digit local through the system by dialing 9 and the local 4 digit number in one string.

## Troubleshooting

It is important to know the following:

- Dial tone is locally generated at each **The String** unit. It does not indicate a phone line is working somewhere else in the system.
- If you pick up a phone attached to **The String** and do not get dial tone prior to dialing a number, it has not completed its power up cycle, is not properly programmed, or has a radio failure.
- When you program **The String** system for use with Modems, you will encounter a very noticeable echo at one end of the conversation over the system. This is due to a change in echo cancellation required for proper modem operation. This is normal.
- We have not yet found a standard telephone that does not work with **The String**. However, a phone may have the wrong settings, or may not be designed to work on a standard POTS (home) phone line.
  - Some older phones have “pulse” and “tone” settings. Almost every phone in the world today uses “tone”. A phone with a “pulse” dial setting will not work.
  - Some digital phones are designed for use only with office digital PBX systems. When in doubt, check the phone in question with a standard POTS (home) phone line, or a phone line in your office dedicated for use with a FAX machine.
- **The String** phone jack may also be used to power such things as horn relays, etc. Again, we have not encountered any of these that do not work when installed according to their manufacturer’s instructions.
- When using outside lines, it is important to understand how they work relative to what you expect. For instance, if you have to dial an access code or a 9 prior to dialing out on a particular phone line, you will need to put these codes into the dial sequence with another 9 in front to access the line. When in doubt, it is always best to try dialing out on the outside line with a conventional phone prior to trying it with a **LINE The String** unit.
- Using **The String** with a cordless phone system of a similar frequency is not recommended. Most manufacturers of these phones do not provide specifications on the exact frequency that they use, therefore it is impossible for us to determine which channels you should program into **The String** system.
- When you make a phone call with **The String**, how the dial tone behaves can provide some troubleshooting information:

- If you get a busy signal within 5 seconds of dialing another extension, either that extension is busy, or you have tried to dial a number that isn't in the system. Such as trying to dial extension 33, for example.
- If the line goes quiet for about 30 seconds, then you get a busy signal, the extension could not be reached. The most typical reason for this is a problem with either the serial numbers not being identical in the units, or a radio related problem.
- If the line goes quiet for over one minute, and you do not ever hear a ring or busy, you should check if the Call LED is illuminated at **The String** unit that you are trying to call. It will most likely be on, indicating that the system has made the connection, but either the phone or phone cable at the phone you are calling is at fault.

Radio problems generally show up as either inability to call from one unit to another, or the call drops within the first minute. What happens when the call drops is that either one end or both ends hears the conversation abruptly end, followed immediately by dial tone. This problem can be caused by a number of issues, including:

- Bad antenna(s)
- Water inside the antenna(s)
- Cabling related issues
  - Poor quality connectors
  - Cross threaded connector on **The String** and cable
  - Bad cable assembly practices
  - Cable assemblies not tested / rated for frequency of operation
- Bad antenna model selection for the site in question
- Questionable radio line of sight to **The String LINE** unit
- Interference in the same frequency used by **The String**
- A bad radio in the **The String**

The best way to diagnose a radio path problem is to dial **The String LINE** from all other units. If you can maintain a phone call for longer than one minute consistently between any unit and the **LINE**, you can

assume that the master working properly, and continue diagnosing the radio path for each additional unit. Additionally, there is a radio signal strength tool for field use called TRadio, which can be downloaded from the Teletics website.

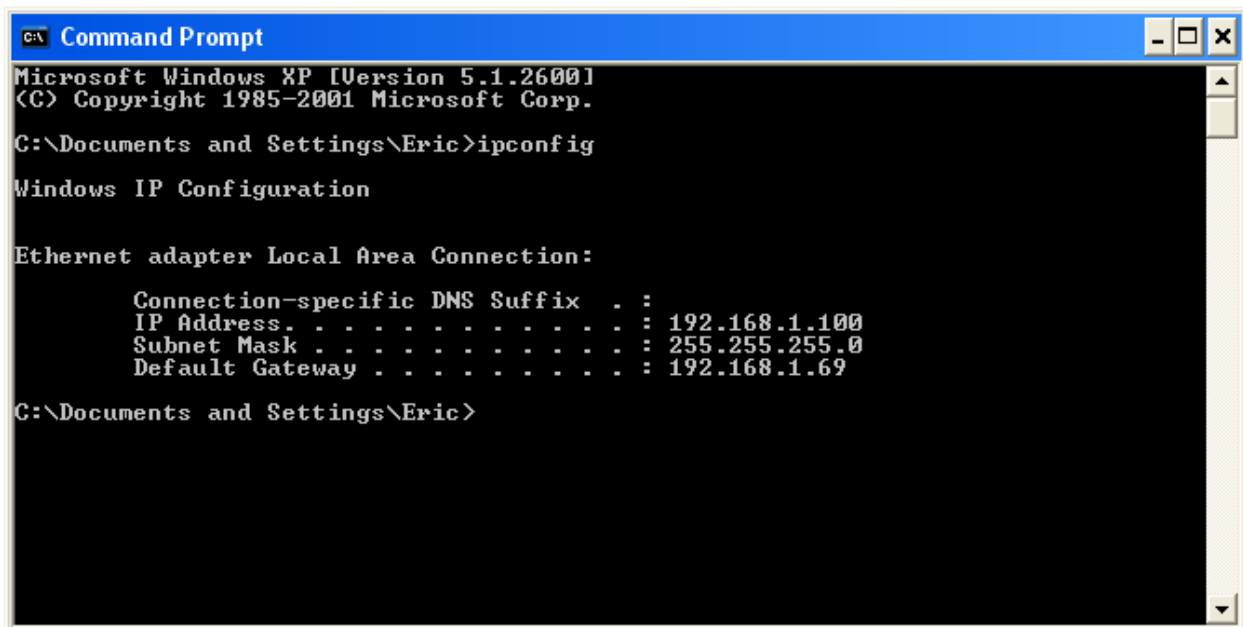
TRadio can be run on a laptop connected to the **The String LINE** unit, and it will display the signal strength for each unit on the system.

It is also important to understand that once one phone can call another phone, the data portion of **The String** is operating. Telephone calls use exactly the same radio path and programming that the Ethernet port on **The String** uses. In essence, the phones are just an extension to the data network.

However, if you are experiencing problems accessing the internet try pinging one of the other computers or routers on the system first. To do this, go to a computer on **The String** system, and open up a command prompt window. (Usually under Start, Programs, Accessories, Command Prompt.)

Type this command: ipconfig

You should see some basic network addresses, and more importantly, something called a default gateway address:



```
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Eric>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    IP Address . . . . . : 192.168.1.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.69

C:\Documents and Settings\Eric>
```

First, you should ping the IP address:

Ping 192.168.1.100 (or whatever numbers you see next to IP Address when you ran ipconfig):

```
C:\ Command Prompt
Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    IP Address . . . . . : 192.168.1.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.69

C:\Documents and Settings\Eric>ping 192.168.1.100

Pinging 192.168.1.100 with 32 bytes of data:

Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\Eric>
```

If you get a reply back from the IP address, it means your network port in the computer seems to be working. Next try to ping your default gateway address:

Ping 192.168.1.69 (again, use whatever numbers are next to Default Gateway on your computer):

```
C:\ Command Prompt

Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\Eric>ping 192.168.1.69

Pinging 192.168.1.69 with 32 bytes of data:

Reply from 192.168.1.69: bytes=32 time<1ms TTL=64
Reply from 192.168.1.69: bytes=32 time<1ms TTL=64
Reply from 192.168.1.69: bytes=32 time<1ms TTL=64
Reply from 192.168.1.69: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.69:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

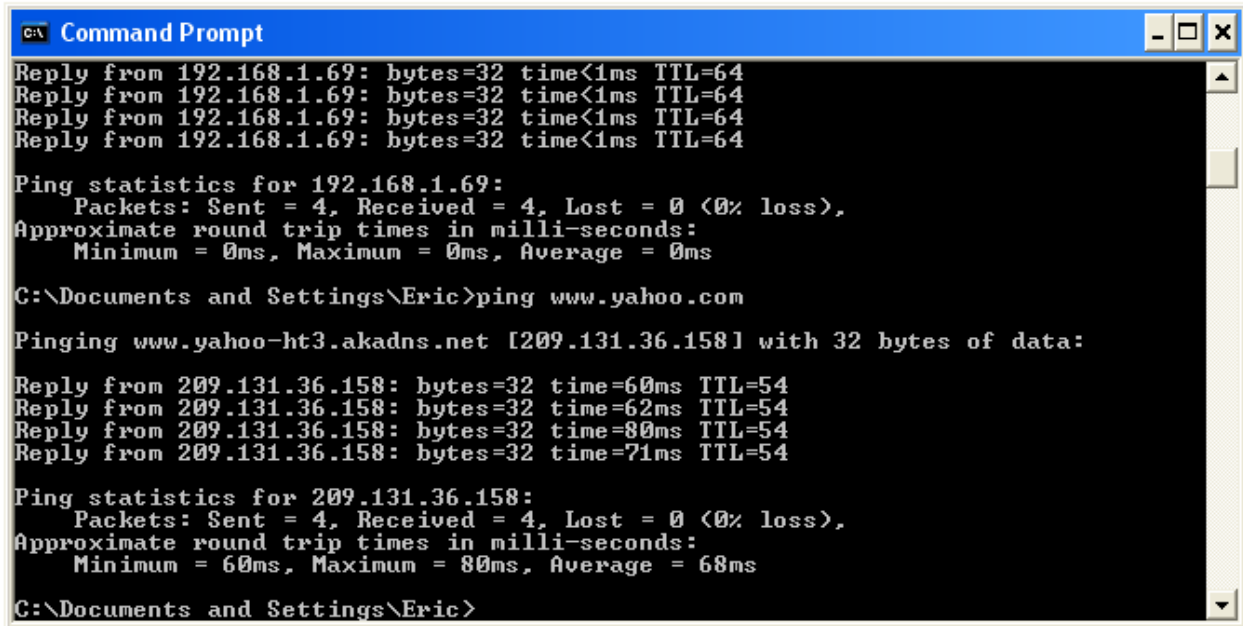
C:\Documents and Settings\Eric>
```

If you get a reply back, the gateway on the network is connected to the computer you are working on, and **The String** units are working correctly. However, there are a number of other settings that you

need for each computer (and some from your internet service provider) to get to the point where you can “surf the internet”.

Assuming that everything works so far, try:

Ping [www.yahoo.com](http://www.yahoo.com):



```
C:\ Command Prompt
Reply from 192.168.1.69: bytes=32 time<1ms TTL=64
Reply from 192.168.1.69: bytes=32 time<1ms TTL=64
Reply from 192.168.1.69: bytes=32 time<1ms TTL=64
Reply from 192.168.1.69: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.69:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\Eric>ping www.yahoo.com

Pinging www.yahoo-ht3.akadns.net [209.131.36.158] with 32 bytes of data:

Reply from 209.131.36.158: bytes=32 time=60ms TTL=54
Reply from 209.131.36.158: bytes=32 time=62ms TTL=54
Reply from 209.131.36.158: bytes=32 time=80ms TTL=54
Reply from 209.131.36.158: bytes=32 time=71ms TTL=54

Ping statistics for 209.131.36.158:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 60ms, Maximum = 80ms, Average = 68ms

C:\Documents and Settings\Eric>
```

If you get a reply back, you should be okay to assume that the internet connection is fine at the computer you are currently working on. If this ping produces an error, you can assume that there is something wrong with the DNS addresses settings in the “Network Settings” section of Windows. Your internet service provider might be able to assist you with what these settings should be.

Keep in mind that **The String** system behaves exactly like an Ethernet cable does. Also, if you can make a phone call between all **The String** stations and out the **LINE**, any networking problems are usually the result of settings in Windows on the computers, or how the internet access and routers are programmed.

In general, if you can phone between stations, the next person to give you help would be the internet service provider, or whoever is providing internet access to the site.

## The String Specifications

Phone Connector	Standard RJ-11
Data Connector	Standard RJ-45
Modem Data Speed Supported	Up to 9600 Baud
Antenna Connector	N Female
Radio Type 2.4GHz	2.4 GHz DSSS License Free
Radio Output Power	200 mW / +23 dBm
Radio Receive Sensitivity	-89 dBm @ 10 <sup>-5</sup> BER
Radio Type 5.8GHz	5.8 GHz DSSS License Free
Radio Output Power	200 mW / +23 dBm
Radio Receive Sensitivity	-89 dBm @ 10 <sup>-5</sup> BER
Maximum Range	25 kms / 15 Miles
Power Required	12 VDC @ 2A
Operating Temperature Range	-40C to +50 C / -40F to +125 F
Dimensions	7.6" x 6.1" x 2.25"
Shipping Weight, including packaging	3.8 kgs / 8.4 lbs
Mounting Holes	8" x 10" x 3"

## **Warranty Statement:**

Teletics warrants **The String** to be free of defects of materials and workmanship for a period of one year after purchase by the original owner.

Teletics will repair or replace, at its option, any **The String** unit that fails to perform the task it was designed for under normal use, provided **The String** unit is returned, at the cost of the owner, to Teletics, or one of Teletics Authorized Repair Facilities in the United States or Canada. Items returned for repair must be accompanied with a problem description and original proof of purchase, such as an invoice.

Any operation of The String outside of specified temperatures, specified input power, environment, or in a manner specified as harmful in this manual 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 from the use, or misuse of this product.

## **Intended Use Statement:**

This product is intended for industrial communications use. Installation is to be performed by qualified Radio Technicians.