

# **Airborne 58**

## **Installation and User Guide**

Rev 1.2 August 3 2015

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## Technical Support

For assistance with any Teletics product, please call us or visit our website.

**Technical Support** (800) 314-5010

**Website** [www.teletics.com/support](http://www.teletics.com/support)

## 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 and ICES-003 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. Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

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.

FCC ID: CTO-WINT

Industry Canada: 10253A

## Introduction

The Teletics Airborne is a wireless data network designed for use with temporary or mobile camps. These situations require that basic on site communications between buildings has to be set up quickly and reliably. The Airborne provides this functionality without the need to run any wire or cable between buildings.

The Airborne system can be used on its own, or connected to other communications systems that provide “backhaul” to the outside world, such as satellite communications, or cellular backhaul links.

Key Airborne features:

- Up to 20 Airbornes can be supported on each radio channel.
- 3 non-overlapping radio channels available.
- 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.
- +24VDC operation.
- 5.8 GHz radios w/ 400 mW radio power output.
- 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 Teletics Airborne

### **Overview**

The Airborne radio system is a byproduct of Teletics very successful w\*intercom system, used on thousands of drilling rigs throughout the world. The Airborne MESH radio system has been proven in very challenging industrial environments, and is simple to setup and use.

Each Airborne has an Ethernet port for use with a computer. All Airborne units in a system act as a common unmanaged Ethernet switch, sharing the available bandwidth on the system.

The Ethernet connection provided by an Airborne system 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 Airborne system is 12 to 48 Mbps, depending on signal strength. This is similar to standard office Ethernet speeds on 100BT Ethernet, and this connection is always faster than the internet connection backhaul provided by satellite or cellular that is provided to the site.

### **Recommended Enclosures, Accessories, Cabling and Antennas**

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

The Airborne is designed either for use indoors with a short length (~25 feet) of LMR400 cable to the outside, or to be placed in an outdoor weatherproof enclosure with a permanently mounted, sealed base style omni-directional antenna on the top of the enclosure with an antenna coupler between the antenna and Airborne, and the connections for data, and either a Teletics supplied power supply or third party power supplies inside. There are numerous outdoor enclosure companies, such as Stahlin, or if Divisional ratings are required for explosive environments, a company called Adalet manufactures explosion proof enclosures and has models which the Airborne will fit inside. Mounting the Airborne is as easy as removing the rubber feet from the bottom of the unit. The threaded holes in the bottom accommodate 6-32 screws that penetrate inside the enclosure by ½” or less. The bottom threaded holes contain the rubber feet, and have hard stops after ½” penetration. Continuing to tighten or force a screw into the Airborne beyond this depth will damage the Airborne enclosure and possibly the electronics inside.

If the radio is operated indoors with RF cable, 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 Airborne and antenna. For example, we have had great success with LMR-400 and LMR-400 ultraflex in colder climates, on drilling rig sites with less than 25 feet of cable between the Airborne 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 Airborne operates. It is highly recommended that RF cables are purchased from a distributor with the capability to test the cable at the frequency of operation used with any Teletics equipment. Additionally, if the Airborne system is rented and moved, that antennas and cables be tested again as the equipment is returned prior to being dispatched to the field a subsequent time. If your organization does not have the capability of testing RF cables at 6 GHz, we strongly recommend an outdoor enclosure mounted approach to installing your Airbornes, as cable failures are our most significant support issue.

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.

Teletics has found that most of our customers have previous experience with third party power supplies, and have chosen a vendor that they already trust. Please choose a power supply capable of delivering at least 1A continuous at a regulated +24VDC output +/- 5% capable of operation over the anticipated operating temperatures. One of the third party power supplies that Teletics has tested is the Meanwell AD-155B power supply, which includes a simple charging circuit for charging a +24V Sealed Lead Acid battery. Optionally, Solar power could also be used, assuming the use of +24VDC solar systems.

When running cables from an indoor to outdoor environment, self fusing rubber tape should be applied to RF connectors exposed to the elements, as well as proper “drip loops” need to be installed where the any cable enters the trailer or building wall. Your Teletics distributor can assist you if you have no previous experience with self fusing rubber tape, or need to purchase some.



Warning !! – Possible Damage to Equipment / Equipment Failure !!

ALL antenna or cable connectors exposed to weather **MUST MUST MUST** have proper ***Self Fusing Rubber Tape*** ONLY used to ensure water does not enter the connectors!!! Failure to do this will cause the system to fail!!!

Please do not substitute other types of tape or sealing methods on RF connectors. Only Self Fusing Rubber tape designed for RF use will work.

## Connections

The Airborne back connector panel looks like this:



Connectors are:

**LAN** is for connection to either a computer or a computer network. The DATA ports on all units in a Airborne system act like a computer hub. There is no routing between them, and each unit has equal priority.

**+24VDC** is for providing power to the unit. This can either be provided over PoE, using the PoE injector provided, or by plugging the wall adapter's DC (barrel connector) directly into the Airborne.

The **ANTENNA** connection is not labeled, and is by itself at the opposite end of the Airborne. It is for use with an antenna rated for 5.8GHz operation. Please contact your Teletics distributor for additional antenna and RF cable assemblies made to your requirements. This connector is a standard N Female.

## Installation

The Airborne system uses MESH technology, which allows each unit to get a repeater in the system, thereby allowing any unit to talk back to the master, through any other units that are along a path back to unit 11. A system may contain as few as 2 Airborne units, or as many as 20.

For any Airborne system to correctly operate, you will need to program one Airborne as unit 11. The rest can be programmed as any number from 12 through 30, however you cannot have two Airborne units with the same number in one system. A system may contain up to 20 Airborne units.

Each Airborne unit has its own serial number that is assigned at the factory. This is on the label of each unit. Additionally, the TUtil Airborne 58 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 Teletics Airborne systems leave the factory, they are tested and shipped as systems with one master and 7 stations. They are numbered 11, 12, 13, 14, 15, 16, 17, 18, and the Group ID for the system is the same as the serial number for the Unit 11 master. The factory default channel is channel. These systems may be deployed right out of the carton as an 8 station system.

However, for example, let's assume that we have a brand new Airborne system in its carton in our shop, and we have two additional "loose" units that we want to make into one 7 station system. For our example let's assume that they have the following serial numbers:

	Unit	Serial Number	Group ID
Complete System:	Unit 11	0805-0360	0805-0360
	Unit 12	0805-0361	0805-0360
	Unit 13	0805-0362	0805-0360
	Unit 14	0805-0363	0805-0360
	Unit 15	0805-0364	0805-0360
Loose Units:	Unit 12	0802-0301	unknown

Therefore, the fastest way to program our example system is to program the loose units to Unit 16 and Unit 17 using TUtil Airborne 58, using the Group ID of the new, complete system, which is 0805-0360. Also, keep in mind that you should use the TUtil factory default channel of Channel 149.

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 Airborne 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. You can refer to the “Powering Up” section on what the LEDs on the front panel mean.

## Indicators and Controls

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

**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 Airborne 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 Airborne needs servicing.

**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.

## Instructions for Use

Once all Airborne units have power applied, and they have had about a half minute to initialize, all of the Ethernet connections of Airbornes programmed with the same GroupID will be part of the same switched network connection. These connections will behave as if they are all plugged into the same Ethernet switch. There is no requirement to set any IP addresses on the Airbornes to have the computers on the network “see” each other. However, the computers being used with the Airbornes will have to have their network settings correct.

## Troubleshooting

Radio problems generally show up as either inability to network computers from one Airborne to another. Wireless networking problems 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 Airborne and cable

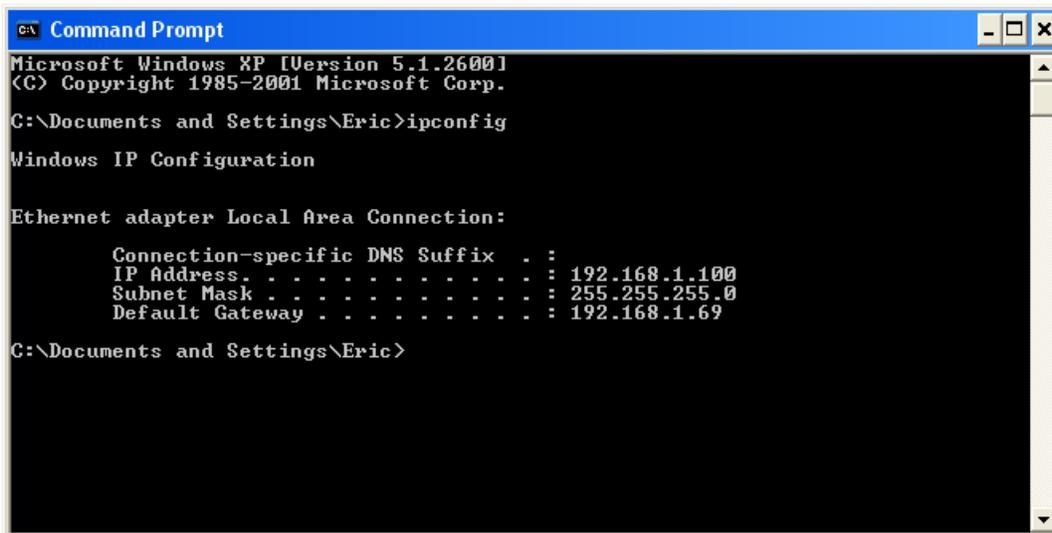
- Bad cable assembly practices
- Cable assemblies not tested / rated for frequency of operation
- Bad antenna model selection for the site in question
- Questionable radio line of sight to master Airborne
- Interference in the same frequency used by the Airborne system
- A bad radio in the Airborne unit

The best way to diagnose a radio path problem is to use TUtil on a computer at the master from each Airborne unit. There is a radio signal strength tool for field use called TUtil, which can be downloaded from the Teletics website.

However, if you are experiencing problems accessing the internet try pinging one of the other computers or routers on the Airborne system first. To do this, go to a computer on the Airborne 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

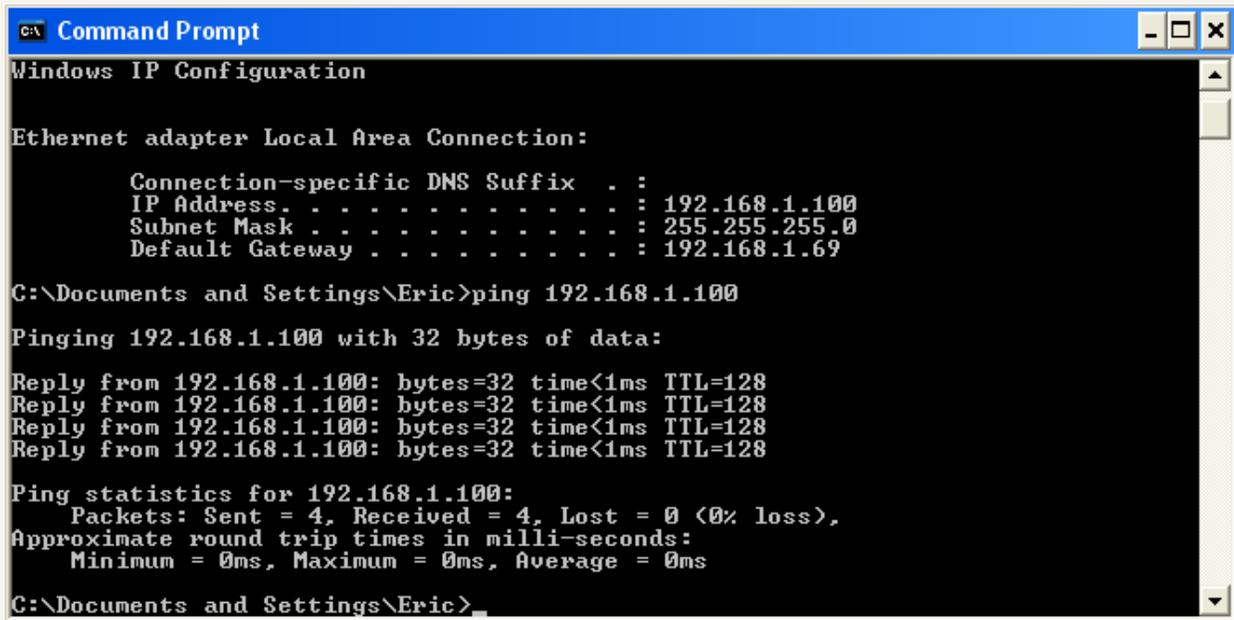
Ethernet adapter Local Area Connection:

    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:

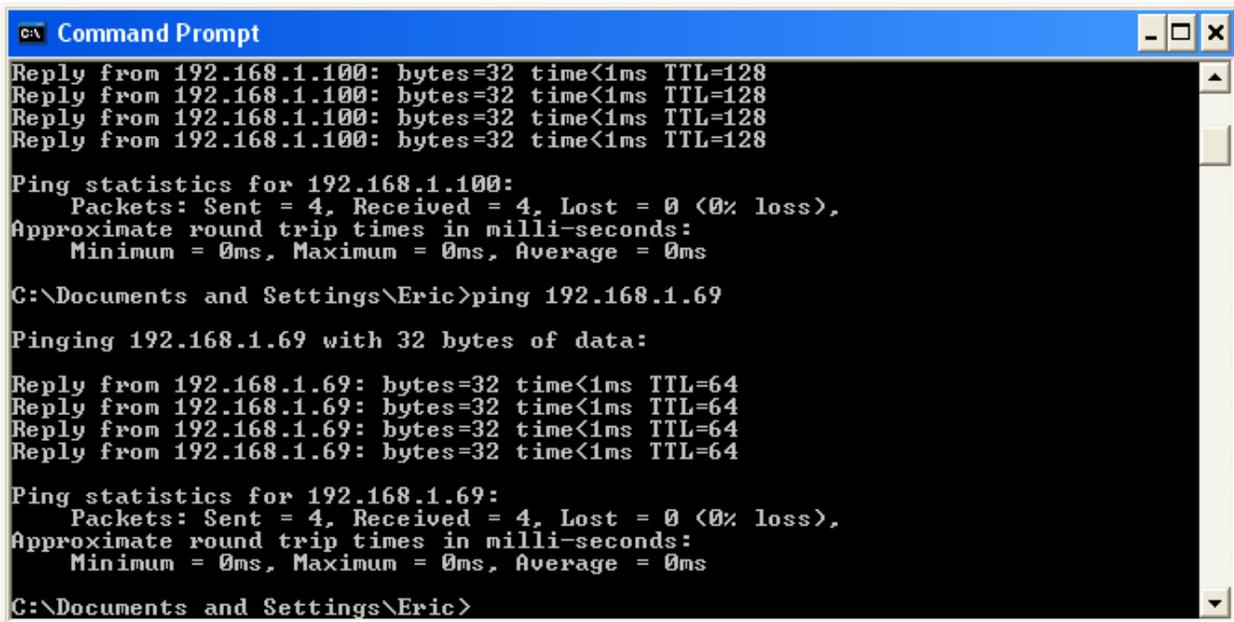
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128

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

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

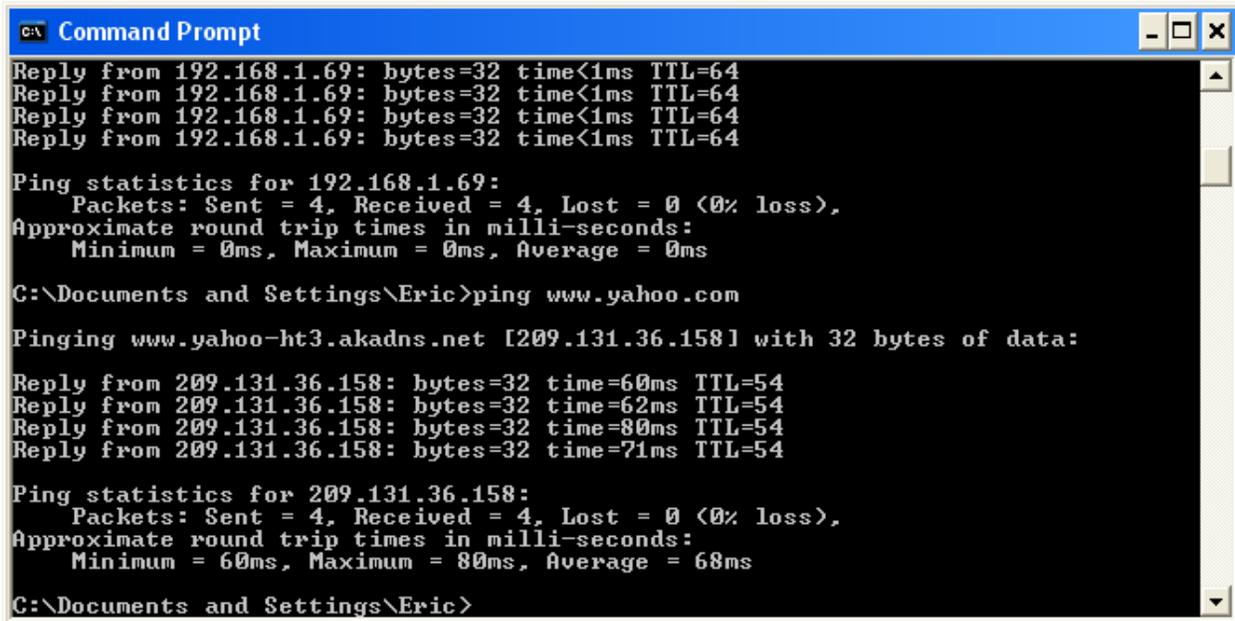
Ping statistics for 192.168.1.69:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

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 Airborne 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
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 Airborne system behaves exactly like an Ethernet cable does. Also, if you can make a phone call between all the Airborne masters and stations, 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 satellite provider, or whoever is providing internet access to the site.

## Airborne 58 Specifications

Data Connector	Standard RJ-45
Antenna Connector	N Female
Radio Type	5.8 GHz DSSS License Free
Radio Output Power	400 mW / +26 dBm
Radio Receive Sensitivity	-89 dBm @ 10 <sup>-5</sup> BER
Maximum Range	25 kms / 15 Miles
Power Required	+24VDC @ 1.0A
Operating Temperature Range	-20C to +50 C / -5F to +125 F
Dimensions	6.75" x 5.25" x 1.95"
Shipping Weight, including packaging	1.8 kgs / 4 lbs
Mounting Holes (approx.)	5.3" x 4.6"

### Warranty Statement:

Teletics warrants the Airborne 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 Airborne unit that fails to perform the task it was designed for under normal use, provided the Airborne 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 Airborne 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.