

Intermec



Quick Start Guide

**PRELIMINARY
EDITION**

20 June 02



**ITRF91501
Reader**

Packing List

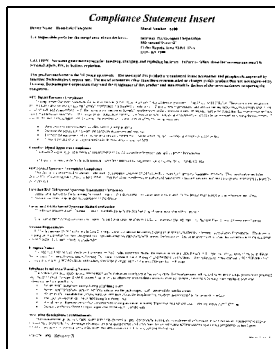


WARNING: *This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.*

Check to ensure that you receive these items:



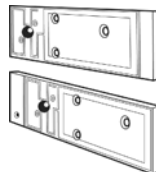
Intermec® ITRF91501 MHz Reader
Model Number ITRF91501
(part number country dependent)



Compliance Statement



Product Warranty Card



RF ID 915 MHz 33 x 105 Container Sample Tags
p/n ITPP9151002

Host Communication

Host communication comes through the 9-pin female D-sub connector. Both RS-232 and RS-422 standards are supported as ordered from the factory or service center

Table 1-1
RS-232 Connections

Pin Number	Definition
2	Serial Data from the Fixed Reader to the host
3	Serial Data to the Fixed Reader from the host
5	Ground
7	CTS (Clear to Send) to the Fixed Reader from the host
8	RTS (Request to Send) from the Fixed Reader to the host

Table 1-2
RS-422 Connections

Pin Number	Definition
1	Serial Data Out + from the Fixed Reader to the host
4	Serial Data Out - from the Fixed Reader to the host
5	Ground
6	Serial Data In + to the Fixed Reader from the host
9	Serial Data In - to the Fixed Reader from the host

The default baud rate is 115.2 kbps with 8 data bits, no parity, and 1 stop bit.

Power Requirements

Power comes in from 8 to 10 volts DC. The Fixed Reader uses less than 2 amps. Intermec supplies 9 volts DC at 2.4 amps from Intermec power supply, p/n: 351-066-001.

User I/O

A general purpose I/O (Input/Output) connector provides signal lines in and out of the reader allowing monitoring and/or control of external devices or functions.

The connector for this is a 13-pin female circular DIN. The mating male connector you need for mating with this is an Intermec p/nL 351-184-001.

Table 1-3
I/O Pin-outs

Pin Number	Definition
1	GPIO IN0
2	GPIO IN1
3	GPIO IN2
4	GPIO IN3
5	GPIO OUT0
6	GPIO OUT1
7	GPIO OUT2
8	GPIO OUT3
9, 10, 11, 12, 13	GROUND though individual 10 ohm resistors

Outputs and inputs have 12 volt transient suppression devices to ground at the connector. Output signals are driven by 2N3904 NPN transistors (low level) with a 100 kohm pull-up to +5 volts through a silicon diode, giving about a 4.3 volt high level. An output can be pulled high from an external source as high as 40 volts. This will however tend to pull the other outputs higher (through two 100k resistors). The low level will be about 0.1 volt up to about 30 mA. The output low voltage will

climb higher as the sink current increases. There is no protection on this. You need to ensure that their load won't require the reader to sink more than 50 mA.

Input signals should be 0 to +1.5 volt for a low input and +3.5 to +5 volts for a high input. Each input has a 1.1 kohm resistor in series with clamping diodes, but only about 1 μ A is used until the input exceeds the 0 to +5 volt input range. There is also a weak (100 kohm) pull-up to +5 volt on each input.

Connecting and Getting Started



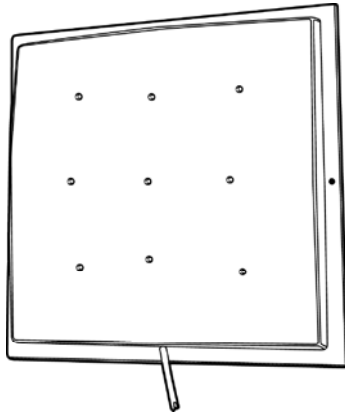
WARNING:

FCC regulations limit exposure to radiofrequency (RF) radiation. To comply with these regulations, operators of this device must maintain a distance of at least 23 cm. (9.1 inches) from the cover on the antenna assembly (The cover on the antenna is the dome shaped surface). While the device is on, the operator's body and parts of the body such as eyes, hands, or head, must be 23 cm. (9.1 inches) or farther from the cover of the antenna assembly.

FCC regulations also require that the antenna assembly of this device be installed in accordance with the installation procedures to allow the operator to comply with the limit.

Antenna Installation

Ensure that you read the above warning before installing the antennas and using your Reader product.



Front view of the antenna

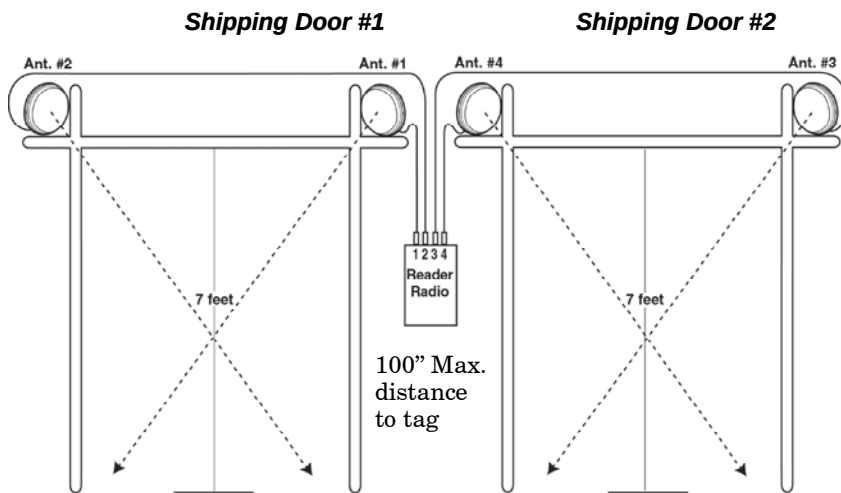
1. Review the locations where the Reader products need integrated. Ensure that you have carefully considered the safe distances for product placement for workers and any other personnel that may get in the RF path.
2. Place the radio and antennas with cabling are easily accessible for installation and troubleshooting.
3. Use the mounting bracket to attach the antenna to a fixed surface.
4. Attach the antenna to one of the four antenna ports on the back of the Reader.
5. Do not transmit simultaneously with multiple antennas.

The following illustrations are a couple of examples for Reader installations.

EXAMPLE 1: Shipping Dock Door, showing two antennas at each shipping door. Two antennas in a crossing pattern provide angular diversity to improve read capability when tag orientation is unknown.



WARNING: *While the device is on, the operator's body and parts of the body such as eyes, hands, or head, must be 23 cm. (9.1 inches) or farther from the cover of the antenna assembly.*



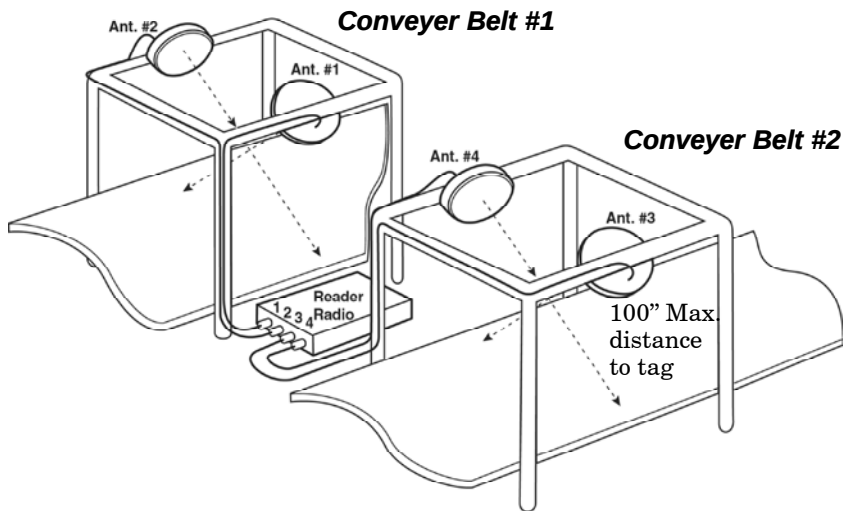
A singular antenna in a portal may be sufficient in applications where there is a known tag orientation.

EXAMPLE 2: Two Product Line Conveyers, showing two antennas on each line. Two antennas in a crossing pattern provide angular diversity to improve read capability when tag orientation is unknown.

The frames for these stations are PVC tubing with RF reflective Mylar liner X2. Ensure that an 9.1 inch (23 cm) distance from the antenna assembly is maintained to limit people's exposure to radiofrequency (RF) radiation.



WARNING: *While the device is on, the operator's body and parts of the body such as eyes, hands, or head, must be 23 cm. (9.1 inches) or farther from the cover of the antenna assembly.*

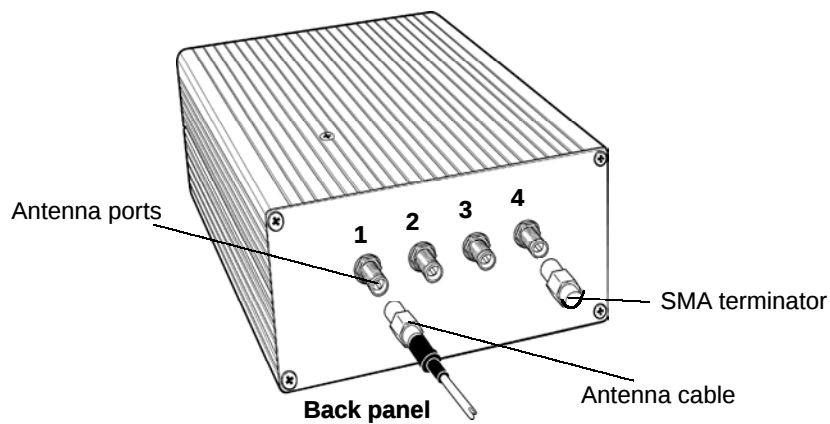


A singular antenna in a portal may be sufficient in applications where there is a known tag orientation.

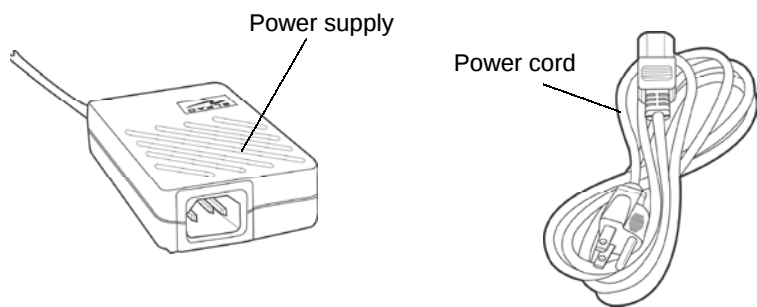
Connecting the Antenna to the Reader

1. Connect antenna cable to a port.
2. Connect a reverse-sex SMA terminator (Intermec p/n 345-004-001) to any port that does not have an antenna attached.

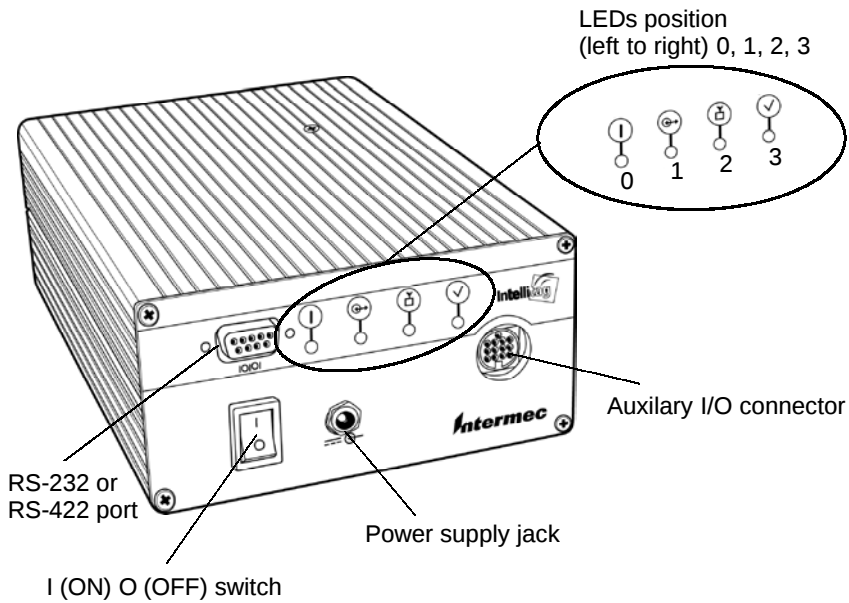
► **NOTE:** *Each port must have either an antenna or a terminator connected.*



3. Connect the Reader to a power source using power supply p/n 351-066-001 and country dependent AC power cord.
4. Turn on your Reader.



- Review the front panel LEDs to become familiar with the status indications you will receive from your Reader.



LED	Meaning
LED 0	Reader has power is initialized and ready.
LED 1	Reader is communicating with the host, it flashes as data transfer occurs.
LED 2	Reader RF is ON and searching for TAGs.
LED 3	Reader is communicating with a TAG, it flashes as transfer occurs.

Troubleshooting

Table 1-4
Troubleshooting

Problem	Solution
Doesn't recognize tag	1. Check to ensure antenna is connected to jack on Reader. 2. Ensure Reader is connected to your computer. 3. Ensure computer is plugged into ac outlet and computer is turned on. 4. Ensure tag is within range of antenna. 5. Access the Intermec web site http://www.intermec.com or http://NorBBS.Norand.com to download and run the diagnostic test utility PENNRFID.EXE. 6. Call Intermec Technical Support 800-755-5505 (US or Canada) 425-356-1799 (elsewhere).

Diagnostic PENNRFID.EXE Utility

Should your Reader fail to read tags, download the test utility from the Intermec web site (<http://www.intermec.com>). This utility PENNRFID.EXE is a self-extracting zip file that includes installation instructions and a test utility to check the operation of the Reader on a laptop or desktop computer. Refer to the README.TXT file included in the zip file for instructions on using the test utility.

Should the reader fail after running this utility, contact Intermec Technical Support and give them the error codes you observe. They will step you through further diagnostic troubleshooting.

Performance Specifications

Dependent upon operating conditions and demands expected. If used in a normal office environment with good read conditions, you could expect to read up to six tags per second. Tags located too far away or in poor locations with respect to interfering objects provides poor results. The Reader gets very warm during continued use. In high ambient temperature (or high temperature within host computer) conditions, the reader could overheat.

Table 1-5
ITRF91501 Reader Specification

Criteria	Range
Operating Temperature	-20° to +55° C (-4° to +131° F)
Storage Temperature	-40° to +85° C (-40° to +185° F)
Humidity	10-95% relative humidity, non-condensing process
Frequency	902-928 MHz
Tag data rates	32K bits per second
Operating Voltage	8-10 volts DC
Ripple	200 mV maximum Peak to Peak
Modulation	AM, On/Off key
Coding	Manchester: From reader to tag
RF Output Impedance	50Ω w/better than 10 dB return loss
Bus Interface	Serial, RS-232 or RS-422
Read Range	100 inches maximum
Write Range	Typically 70% of Read Range
Tag identification	Up to 30 tags per second
Write Rate	20 ms per byte per tag
Read current	1.3 Amps
Protocol	ANSI NCTIS T6 256-2001 standard.

Table 1-5 (Continued)
ITRF91501 Reader Specification

Criteria	Range
Vibration	1.0 GRMS. 10 to 500 Hz in three axis
Channel switching	30 uS (TX on a channel, to TX on any other channel)
Frequency stability	± 100 PPM
Transmitter power output	700 mW (min.), 800 mW (typical), 1000 mW(max.), @ connector.
Safety Approvals	USA: UL Listed, C22.2 No. 950/UL 1950 (605969)
Electrical Emissions	USA: FCC Part 15, Class A
RF Approval	USA: 915 MHz Frequency FCC 15.247
Shock	20Gs, 11 ms, half sine pulse
ESD	+8 KV (indirect) +4 KV (direct); 15 KV (except conductor pin (4KV)) in direct air discharge



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ITRF91501 Reader, Quick Start Guide-March, 2002



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