

# ***Tag-it™ Reader System Series 6000***

*Reader Module*

*RI-R00-320A*

*Reader Module with RS232 Interface* *RI-R00-321A*

## ***Reference Guide***

## Edition Two - January 2001

This is the second edition of this manual. It describes the **Tag-it Reader System Series 6000 (formerly published as Series 320)**.

It contains a description of the following modules:

Reader Module RI-R00-320A

Reader Module with RS232 Interface RI-R00-321A

Texas Instruments (TI) reserves the right to make changes to its products or services or to discontinue any product or service at any time without notice. TI provides customer assistance in various technical areas, but does not have full access to data concerning the use and applications of customer's products.

Therefore, TI assumes no liability and is not responsible for customer applications or product or software design or performance relating to systems or applications incorporating TI products. In addition, TI assumes no liability and is not responsible for infringement of patents and/or any other intellectual or industrial property rights of third parties, which may result from assistance provided by TI.

TI products are not designed, intended, authorized or warranted to be suitable for life support applications or any other life critical applications which could involve potential risk of death, personal injury or severe property or environmental damage.

The **TIRIS** logo and the words **TIRIS** and **Tag-it** are trademarks or registered trademarks of Texas Instruments Incorporated.

Copyright © 2001 Texas Instruments Incorporated (TI)

This document may be downloaded onto a computer, stored and duplicated as necessary to support the use of the related TI products. Any other type of duplication, circulation or storage on data carriers in any manner not authorised by TI represents a violation of the applicable copyright laws and shall be prosecuted.

## Read This First

### About This Manual

This reference guide for the Tag-it Reader System Series 6000 is designed for use by TI partners who are engineers experienced with TIRIS and Radio Frequency Identification Devices (RFID).

**Regulatory, safety and warranty notices that must be followed are given in Chapter 5.**

### Conventions



#### **WARNING:**

**A WARNING IS USED WHERE CARE MUST BE TAKEN, OR A CERTAIN PROCEDURE MUST BE FOLLOWED IN ORDER TO PREVENT INJURY OR HARM TO YOUR HEALTH.**



#### **CAUTION:**

**This indicates information on conditions which must be met, or a procedure which must be followed, which if not heeded could cause permanent damage to the equipment or software.**



#### **Note:**

Indicates conditions which must be met, or procedures which must be followed, to ensure proper functioning of the equipment or software.



#### **Information:**

Indicates information which makes usage of the equipment or software easier

### If You Need Assistance

For more information, please contact the sales office or distributor nearest you. This contact information can be found on our web site at:

<http://www.tiris.com>

## Document Overview

	<b>Page</b>
<b>Chapter 1: Introduction</b> .....	<b>5</b>
1.1 General .....	6
<b>Chapter 2: Reader Module 320A</b> .....	<b>7</b>
2.1 General .....	8
2.2 Functional Description.....	9
2.3 Reader Module Interfaces.....	9
2.4 Installation .....	12
<b>Chapter 3: Reader Module 321A (with RS232 Interface)</b> .....	<b>15</b>
3.1 General .....	16
3.2 Functional Description.....	17
3.3 Reader Module Interfaces.....	18
3.4 Installation .....	20
<b>Chapter 4: Technical Data</b> .....	<b>23</b>
4.1 Specification Summary.....	24
4.2 Packing .....	25
4.3 Storage.....	25
<b>Chapter 5: Regulatory, Safety and Warranty Notices</b> .....	<b>26</b>
5.1 Regulatory Notes .....	27
5.2 Safety Precautions .....	28
5.3 Warranty and Liability.....	29

## List of Figures

	<b>Page</b>
Figure 1: Tag-it Reader Module (RI-R00-320A) .....	6
Figure 2: Tag-it Reader Module with RS232 Interface (RI-R00-321A).....	6
Figure 3: Basic System Overview (RI-R00-320A) .....	8
Figure 4: Reader Module (RI-R00-320A) - Top view.....	8
Figure 5: Reader Module (RI-R00-320A) Interfaces.....	10
Figure 6: Reader Module (RI-R00-320A) Dimensions.....	11
Figure 7: Mounting Bolts (RI-R00-320A) .....	13
Figure 8: Location of Potentiometer R3 (RI-R00-320A) .....	14
Figure 9: Basic System Overview (RI-R00-321A) .....	16
Figure 10: Reader Module (RI-R00-321A) - Top view.....	16
Figure 11: Reader Module (RI-R00-321A) Interfaces.....	18
Figure 12: Reader Module (RI-R00-321A) Dimensions.....	19
Figure 13: Low Voltage Connector.....	20
Figure 14: Mounting Bolts (RI-R00-321A) .....	21
Figure 15: Location of Potentiometer R3 (RI-R00-321A) .....	22
Figure 16: Packing .....	25

## List of Tables

	<b>Page</b>
Table 1: Reader Board Power (J1) Pin Connections.....	10
Table 2: Reader Board TTL Asynchronous (J2) Pin Connections.....	10
Table 3: Reader Board TTL Expansion (J3) Pin Connections.....	11
Table 4: Reference values for tuning the Reader Module (RI-R00-320A).....	14
Table 5: Reader Board Power (J1) Pin Connections.....	19
Table 6: RS232 Interface Power Connections .....	19
Table 7: Reference values for tuning the Reader Module (RI-R00-321A).....	22

# Introduction

This chapter introduces you to the Tag-it™ Reader System Series 6000.

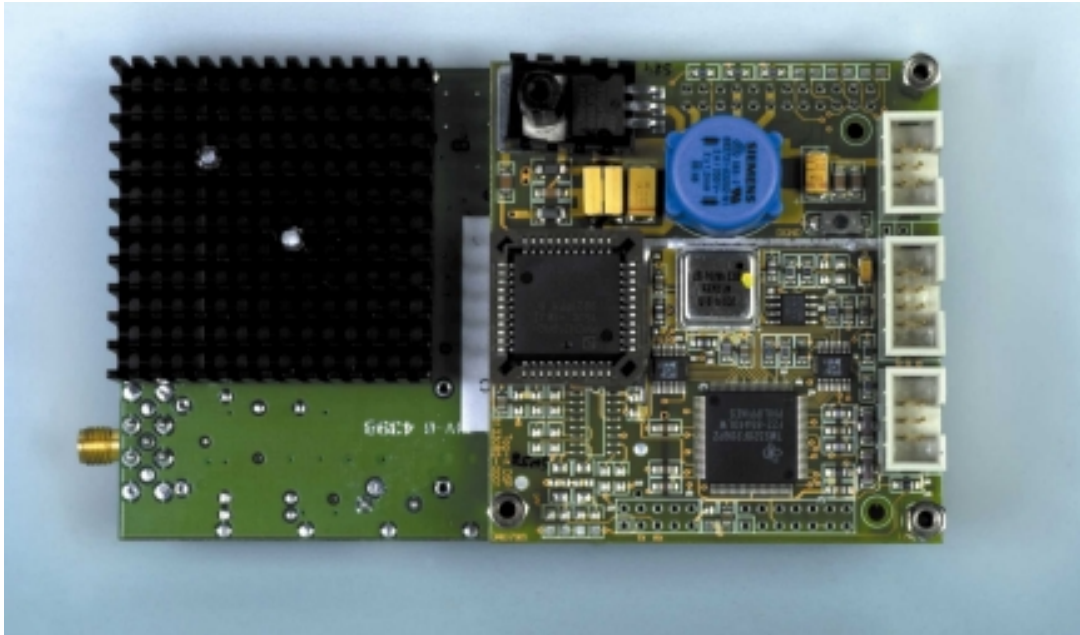
Topic	Page
1.1 General.....	6

## 1.1 General

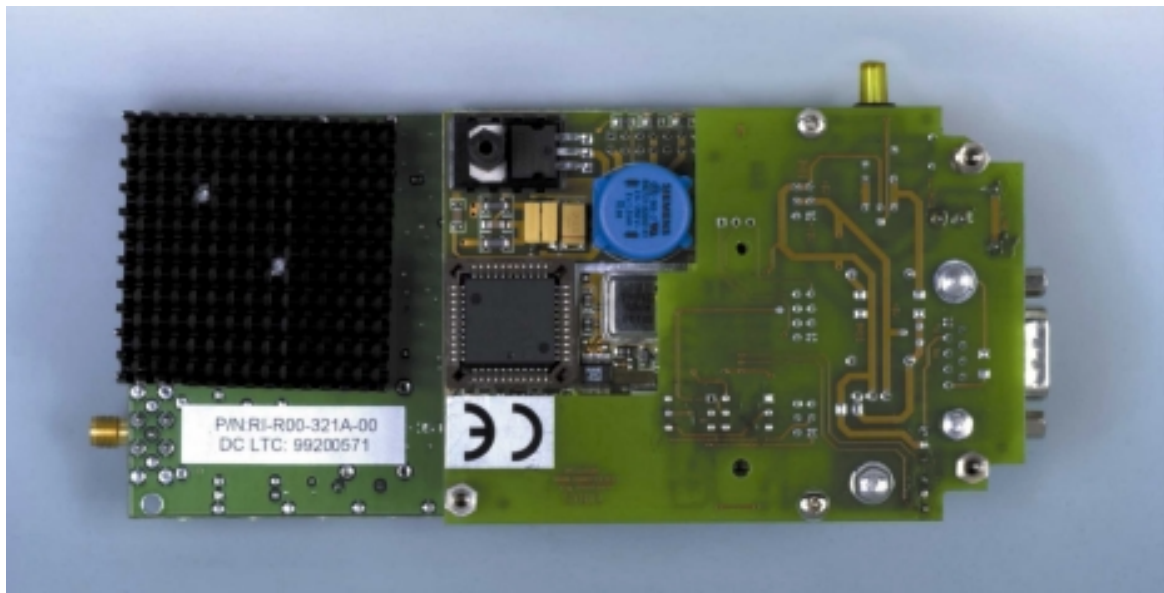
The Tag-it™ Reader System Series 6000 works at a frequency of 13.56 MHz. It comprises a reader, antenna, and transponders. This reference guide provides details about the Tag-it Reader Module which is available with or without an RS232 interface board.

The Tag-it Reader Module handles all RF and digital functions required in order to read Tag-it transponders. The Tag-it RS232 Interface Board provides signal level conversion and serial interface for the reader.

**Figure 1: Tag-it Reader Module (RI-R00-320A)**



**Figure 2: Tag-it Reader Module with RS232 Interface (RI-R00-321A)**



# Reader Module 320A

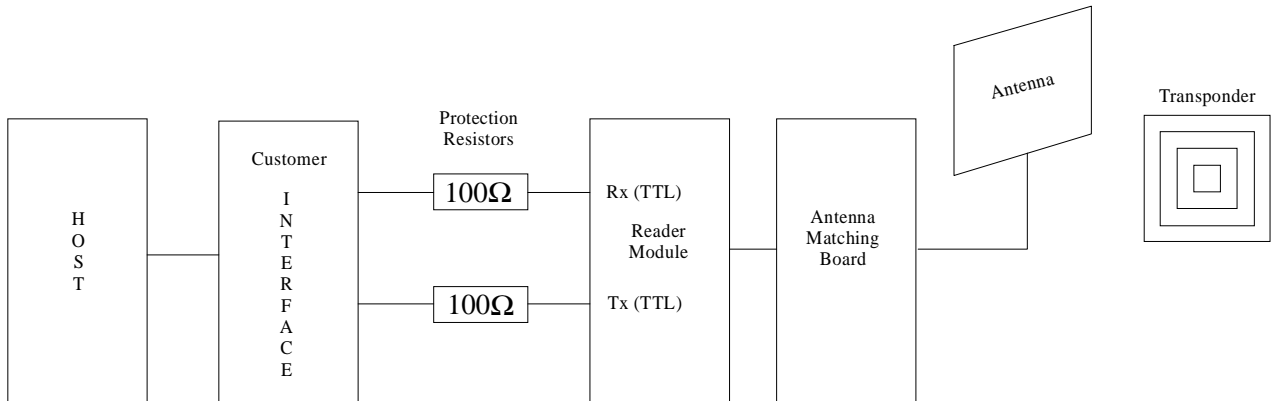
This chapter describes the Tag-it™ Reader Module 320A. It describes the module's functionality, its interfaces, and finally it provides all the information that you need in order to install the module.

Topic	Page
<b>2.1 General.....</b>	<b>8</b>
<b>2.2 Functional Description .....</b>	<b>9</b>
<b>2.3 Reader Module Interfaces .....</b>	<b>9</b>
2.3.1 Connectors .....	10
2.3.2 Dimensions .....	11
<b>2.4 Installation .....</b>	<b>12</b>
2.4.1 What You Will Need .....	12
2.4.2 Mounting .....	13
2.4.3 Attaching Cables and Interfacing .....	13
2.4.4 Transmitter Output Power .....	14

## 2.1 General

The Tag-it™ Reader Module 320A consists of a transmitter, receiver and digital control module, which communicates with individual tags. The reader is designed to be integrated into and controlled by an existing host system such as a PC, a larger computer system, or other intelligent device (for example: a ticket printer or fixed point identification scanner) through an external (for example: RS232) interface (not part of this module).

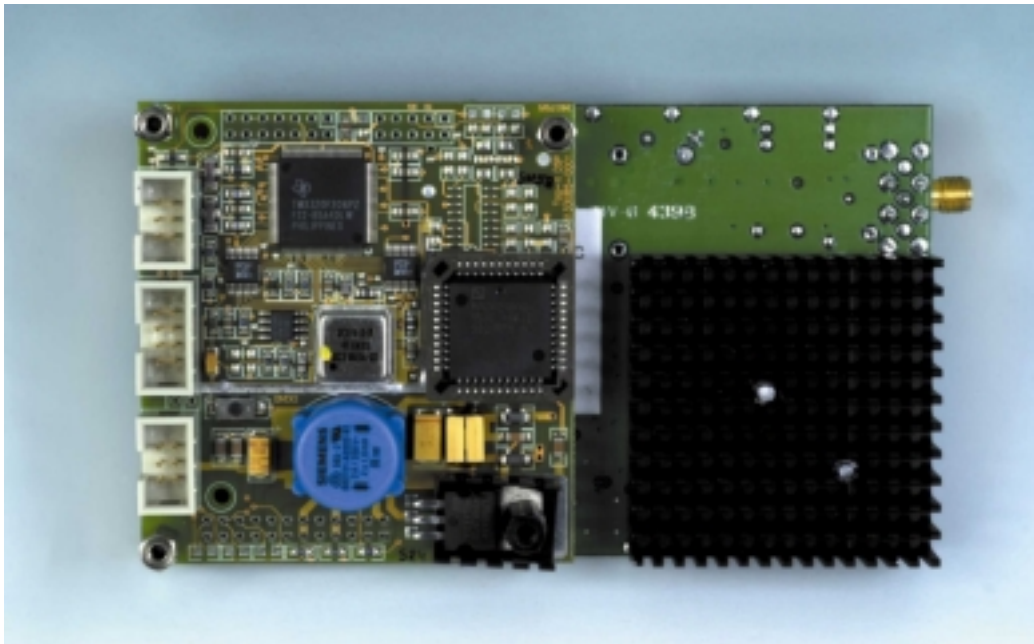
**Figure 3: Basic System Overview (RI-R00-320A)**



**Note:**

We strongly recommend that you use two 100 Ω series protection resistors on the TTL-level Rx/Tx lines (J2 pins 1 & 3) as shown in Figure 4 in order to avoid damaging the 320A reader module.

**Figure 4: Reader Module (RI-R00-320A) - Top view**





## 2.2 Functional Description

The Tag-it Reader Module:

- Combines the analog RF and digital capabilities of two sub-assembly boards
- Integrates RF transmit and receive functionality
- Includes Tag-it firmware that provides functionality for linking with host computer systems and reading the transponder signals.

Other functionality onboard includes the following:

- Common Mode noise filter
- Single 12-Volt power supply connector
- Asynchronous serial port with 19,200 Baud
- Expansion port for reader synchronization
- Connector for antenna.

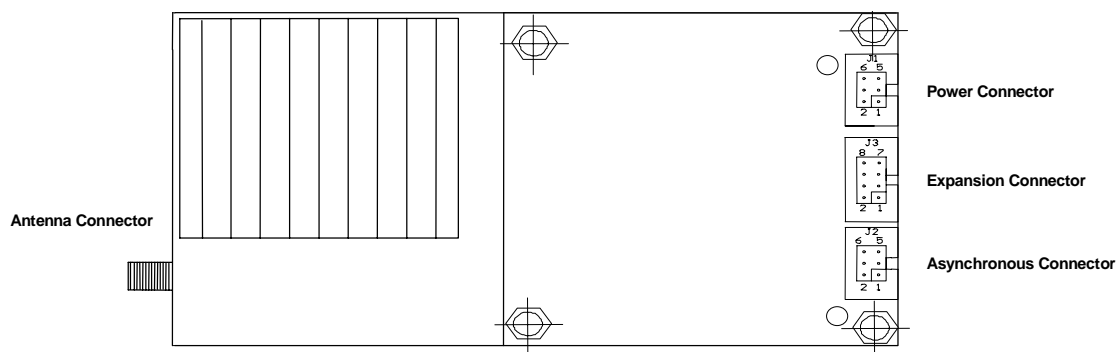
The Tag-it Reader Module provides an antenna output that is matched to an impedance of 50 Ohms at 13.56 MHz.

## 2.3 Reader Module Interfaces

The power, asynchronous and the expansion connectors are located on the right-hand side of the Reader Module. The SMA antenna connector is positioned on the opposite side.

The connectors are as follows:

- power supply (J1), a 6-pin double row male connector with a pitch of 2.54 mm
- antenna (SMA) connector
- asynchronous serial port (J2), a 6-pin double-row male connector with a pitch of 2.54 mm
- expansion port (J3), an 8-pin double row male connector with a pitch of 2.54 mm.

**Figure 5: Reader Module (RI-R00-320A) Interfaces**

### 2.3.1 Connectors

**Table 1: Reader Board Power (J1) Pin Connections**

J1, Power Connector (double row, male)		
Pin #	Connection	
1	+12 V	Input Voltage
2	+12 V	Input Voltage
3	Not used	
4	Not used	
5	Ground (PGND-1)	Ground Input Power Supply
6	Ground (PGND-1)	Ground Input Power Supply

**Table 2: Reader Board TTL Asynchronous (J2) Pin Connections**

J2, TTL Asynchronous Connector (double row, male)		
Pin #	Connection	
1	Transmit data (TX)	Data Reader to Host, TTL-level
2	NC	Not connected
3	Receive data (RX)	Data Host to Reader, TTL-level
4	NC	Not connected
5	Ground (GND)	Reference point for signals
6	NC	Not connected

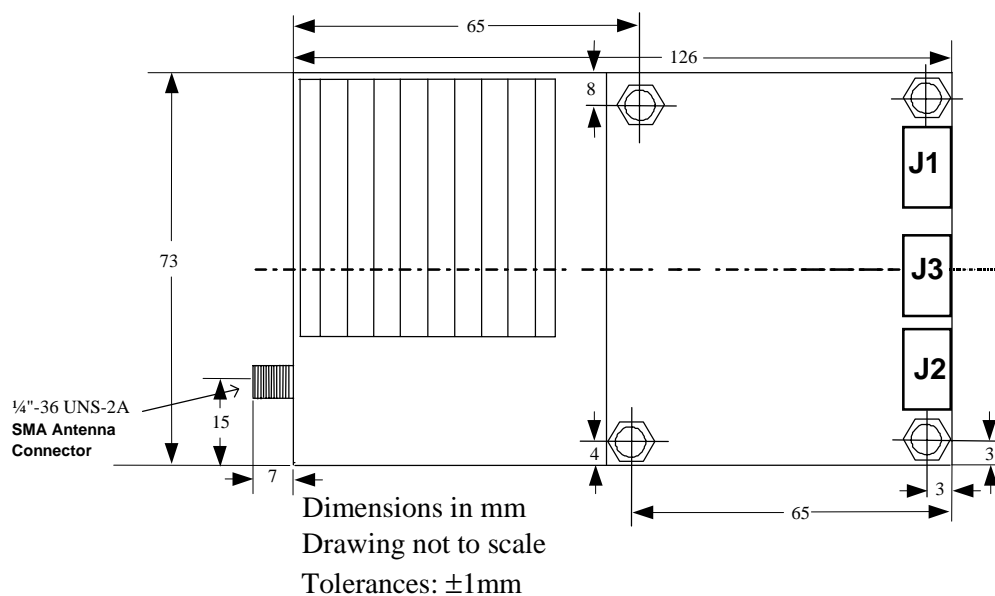
**Table 3: Reader Board TTL Expansion (J3) Pin Connections**

J3, TTL Expansion Connector		
Pin #	Connection	
1	NA	Not supported
2	NA	Not supported
3	NA	Not supported
4	NA	Not supported
5	Signal Ground (GND)	Reference point for signals
6	Signal Ground (GND)	Reference point for signals
7	Signal Input	Input reserved for future use (synchronization)
8	Signal output	Output reserved for future use (synchronization)

**CAUTION:**

Do not connect the ground signals of the Power Connector (J1 pins 5 and 6: PGND-1) and other GND pins (J2 pin 5, J3 pins 5 and 6) directly to each other; otherwise the ground leg of the common mode coil implemented on the reader will be rendered ineffective.

### 2.3.2 Dimensions

**Figure 6: Reader Module (RI-R00-320A) Dimensions**

## 2.4 Installation

### 2.4.1 What You Will Need

- 2 connectors (female) straight, double row 6-pin (pitch 2.54, height 7 mm)
- 1 connector (female) straight, double row 8-pin (pitch 2.54, height 7 mm)
- 1 connector for antenna cable Type RF-SMA (male/SW 8)
- 4 screws M3x(XX) (XX = length depends on the wall thickness of the object to mount on)
- Power supply 12 V  $\pm$  5%, min. 1.3 A
- PC with RS232 Interface and installed software, for example:  
"Tag-it Navigator" (RI-S00-NAV1)
- A custom RS232 Interface board is required for the 320A reader (an interface board is delivered with the 321A reader, the 320A reader only provides TTL-level asynchronous serial signals on interface connectors).

Recommended for Reader RF-Power adjustment:

- Oscilloscope,  
min. 30 MHz, to measure peak-to-peak values at resolutions of 0.1 Vpp
- 50  $\Omega$  dummy load (inductive free) for antenna representation
- Tuning screwdriver



#### Information:

We recommend that you use the Tag-it Navigator™ to control the Tag-it reader.

Tag-it Navigator is a Windows program capable of communicating with the Tag-it Commander reader units via a standard serial interface. It supports the Host Protocol implemented in the reader, allowing all supported commands to be executed, for example: writing and reading data to and from Tag-it transponders.

Tag-it Navigator is a tool, which can be used for reader setup, tuning, or diagnosis. Additionally, it can log transponder responses for initial experimentation and testing with the Tag-it System. It provides data and time information, and can display the acquired data in a number of different formats.

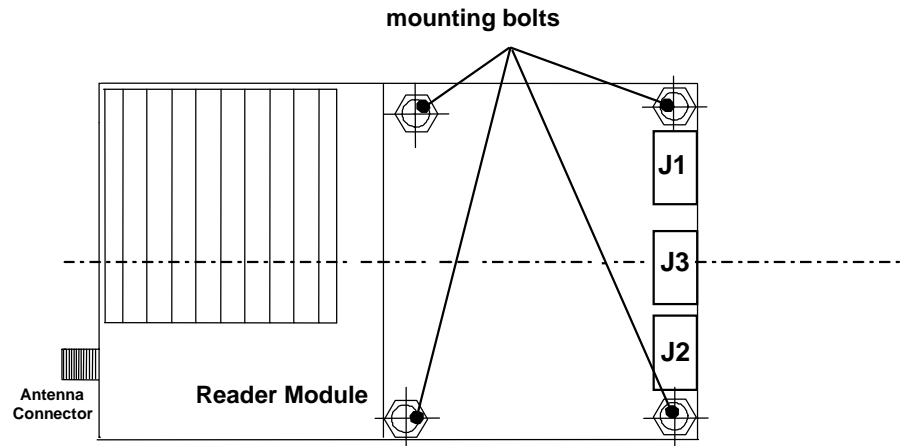
The Tag-it Navigator can be obtained from your nearest TIRIS Sales Office, or downloaded from the TIRIS Web Site <http://www.tiris.com>.

---

### 2.4.2 Mounting

- Place the Reader Module carefully into or onto the object or housing that has been prepared with holes for the mounting bolts.
- Secure the Reader Module to the object/housing using the four screws for the mounting bolts.

Figure 7: Mounting Bolts (RI-R00-320A)



**WARNING:**

**THE HEAT SINKS OF THE READER MODULE CAN GET HOT (APPROXIMATELY 80°C). THEREFORE, BE CAREFUL NOT TO TOUCH THE HEAT SINKS WHEN THE READER IS TURNED ON. HANDLE THE READER MODULE WITH CARE TO AVOID BEING BURNT.**

**MAKE SURE YOU HAVE SELECTED PROPER MOUNTING MATERIALS, WHICH WITHSTAND THESE TEMPERATURES.**

### 2.4.3 Attaching Cables and Interfacing

- Connect the data communication cables to connector J2 or the serial interface board (note that J2 is TTL-level only!).
- Attach the antenna.
- Attach the power supply.



**CAUTION:**

**Make sure the power supply is switched to “OFF” before connecting the power cable.**

**Connector misalignment can damage the Reader Module.**

### 2.4.4 Transmitter Output Power

The reader output power can be adjusted by potentiometer R3. The location of potentiometer R3 is shown in Figure 8.

Perform the following steps in order to achieve proper hardware and software conditions:

- Connect the 50  $\Omega$  dummy load to the SMA antenna connector.
- Switch power at PC and power supply for Reader Module to "On".
- Start the software, for example: "Tag-it Navigator".
- Set command "Transmitter" to "On" Continuous Wave (CW).
- Measure peak-to-peak voltage across the dummy load with scope at impedance of 1 M $\Omega$ .
- Calculate the transmitted power regarding the following equation:

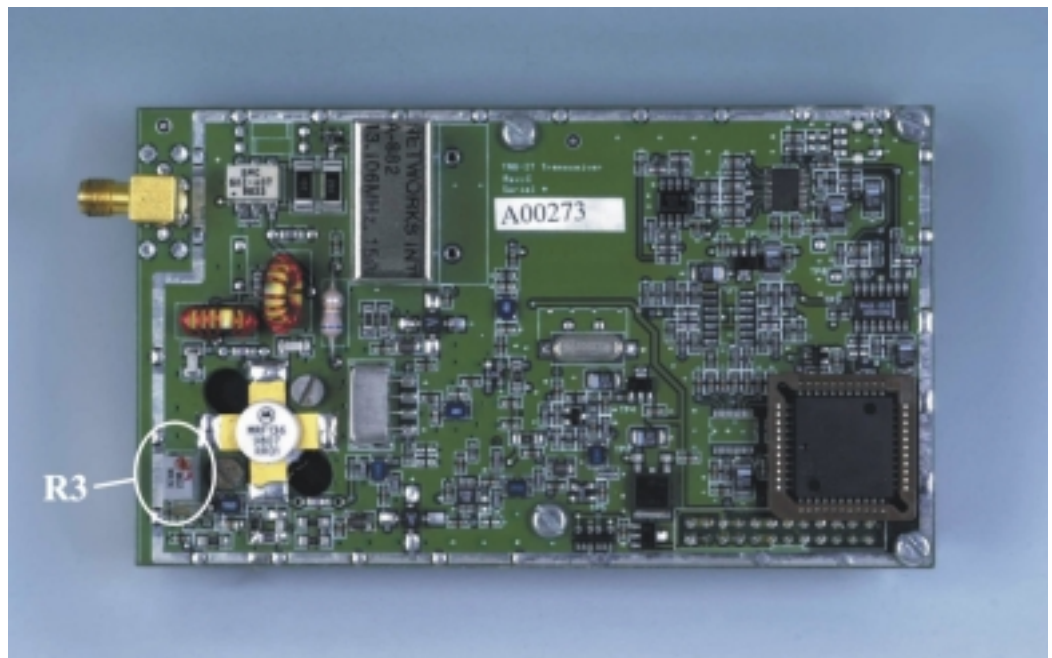
$$P = V_{\text{eff}}^2 / R \Rightarrow V_{\text{pp}} = 2.82 \sqrt{(P \cdot 50 \Omega)}$$

Table 4 shows some approximate reference values that can be expected.

**Table 4: Reference values for tuning the Reader Module (RI-R00-320A)**

Voltage (Vpp)	6.30	14.1	19.9
Power in mW	100	500	1000

**Figure 8: Location of Potentiometer R3 (RI-R00-320A)**



# Reader Module 321A (with RS232)

This chapter describes the Tag-it Reader Module 321A which includes an RS232 Interface. It provides information about the module itself, its interfaces and finally, how to install it.

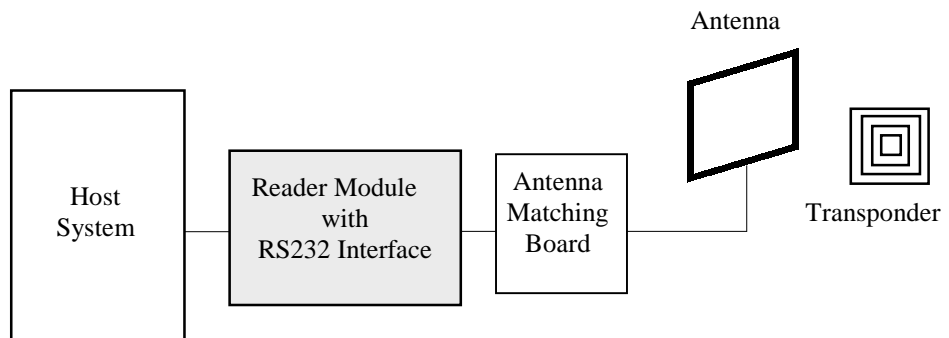
Topic	Page
<b>3.1 General.....</b>	<b>16</b>
<b>3.2 Functional Description .....</b>	<b>17</b>
<b>3.3 Reader Module Interfaces .....</b>	<b>18</b>
3.3.1 Connectors.....	19
3.3.2 Dimensions .....	19
<b>3.4 Installation .....</b>	<b>20</b>
3.4.1 What You Will Need .....	20
3.4.2 Mounting .....	21
3.4.3 Attaching Cables .....	21
3.4.4 Transmitter Output Power .....	22

### 3.1 General

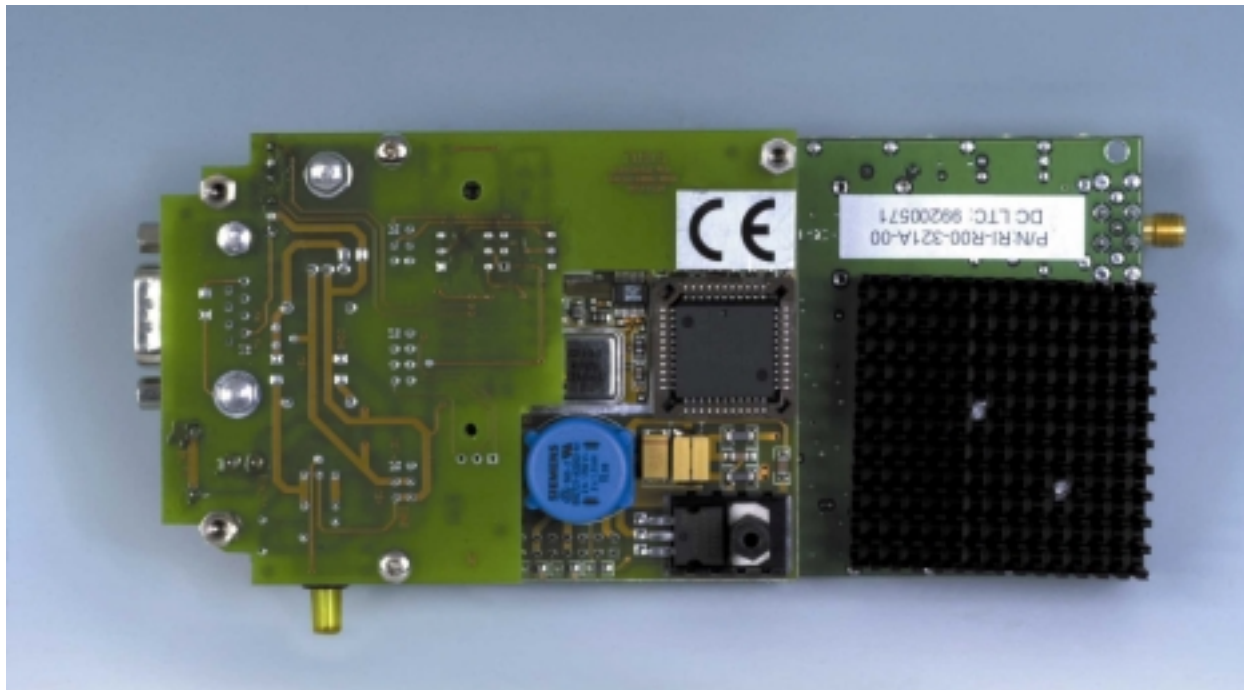
The Tag-it™ Reader Module 320A consists of a transmitter, receiver and digital control module, which communicates with individual tags. The reader is designed to be integrated into and controlled by an existing host system such as a PC, a larger computer system, or other intelligent device (for example: a ticket printer or fixed point identification scanner) through its RS232 interface.

The Tag-it™ RS232 Interface board attached to the Reader Module is specially designed for the Tag-it Reader Module, provides all required functions to communicate with a standard host system, such as a PC.

**Figure 9: Basic System Overview (RI-R00-321A)**



**Figure 10: Reader Module (RI-R00-321A) - Top view**





## 3.2 Functional Description

The Reader Module 321A (RI-R00-321A) has the same functionality as the Reader Module 320A (RI-R00-320A) but also comprises an RS232 Interface Module attached to it.

The RS232 Interface module converts the asynchronous TTL signals of the Reader Module to standard RS232 signals. The TTL input/output interface is augmented with a serial interface when the Reader Module is combined with the RS232 Interface Board. This board provides an asynchronous serial communication interface that can be directly connected to commonly used system controllers or PCs. Features include the following:

- RS232-compatible asynchronous serial port (UART)
- Common Mode noise filter to minimize conducted emissions
- LED for on/off indicator
- $\pm 15\text{kV}$  ESD-protected transceivers
- EMI filter for RS232 lines
- 9-pin D-sub connector
- On-board null-modem connection
- Data rate up to 38,400 bits per second  
(19,200 bits per second implemented with current firmware)
- Single 12 Volt power-supply connector

The Tag-it Reader Module provides an antenna output that is matched to an impedance of 50 Ohms at 13.56 MHz.

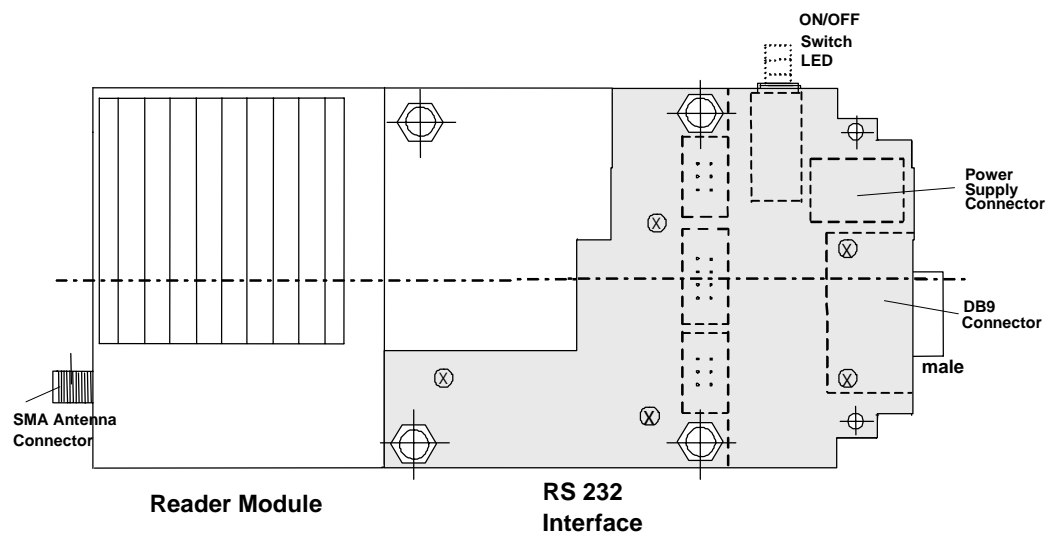
### 3.3 Reader Module Interfaces

This section defines the interfaces of the Reader Module and the RS232 Interface Board.

The connectors are as follows:

- antenna (SMA) connector
- the power supply connector
- a DB9 male connector

**Figure 11: Reader Module (RI-R00-321A) Interfaces**



### 3.3.1 Connectors

**Table 5: Reader Board Power (J1) Pin Connections**

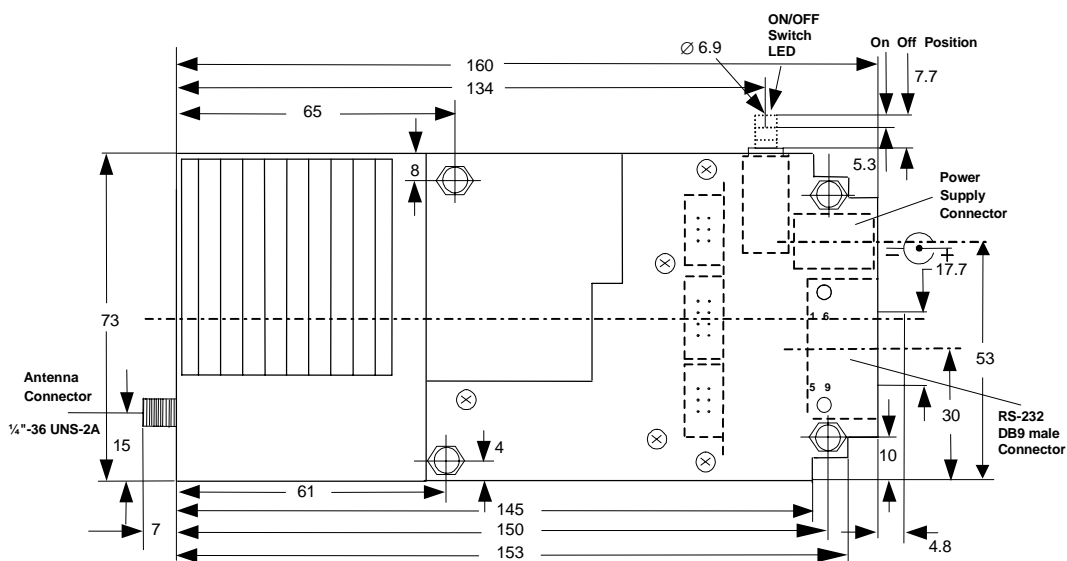
RS232 DB9 Connector (male)		
Pin #	Connection	
1	NC	Not connected
2	Transmit data (TX)	Data - reader to host
3	Receive data (RX)	Data - host to reader
4	NC	Not connected
5	Signal ground (GND)	Reference point for signals
6	NC	Not connected
7	NC	Not connected
8	NC	Not connected
9	NC	Not connected

**Table 6: RS232 Interface Power Connections**

RS232 Power Connector		
	Connection	
Pin	+12 Volt	Input Voltage from Power Supply
	Ground Input (PGND-2)	Power Supply Ground

### 3.3.2 Dimensions

**Figure 12: Reader Module (RI-R00-321A) Dimensions**

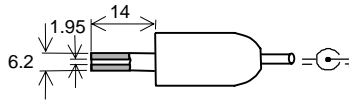


## 3.4 Installation

### 3.4.1 What You Will Need

- RS232 cable (1:1 connection) female/female connectors
- Linear regulated 12 V  $\pm$  5% Power Supply min. 1.3 A including low voltage connector

**Figure 13: Low Voltage Connector**



- 1 antenna cable with connector Type RF-SMA (male)
- 2 connectors (female) straight, double row 6-pin (pitch 2.54, height 7 mm)
- 4 screws M3x(XX) (XX = length depends on the wall thickness of the object to mount on)
- Power supply 12 V  $\pm$  5%, min. 1.5 A
- PC with RS232 Interface and installed software, for example:  
"Tag-it Navigator" (RI-S00-NAV1)

Recommended for reader tuning:

- Oscilloscope,  
min. 30 MHz, to measure peak-to-peak values at resolutions of 0.1 Vpp
- 50  $\Omega$  dummy load (inductive free) for antenna representation
- Tuning screwdriver



#### Information:

We recommend that you use the Tag-it Navigator™ to control the Tag-it reader.

Tag-it Navigator is a Windows program capable of communication with the Tag-it Commander reader units via a standard serial interface. It supports the Host Protocol implemented in the reader, allowing all supported commands to be executed, for example: writing and reading data to and from Tag-it transponders.

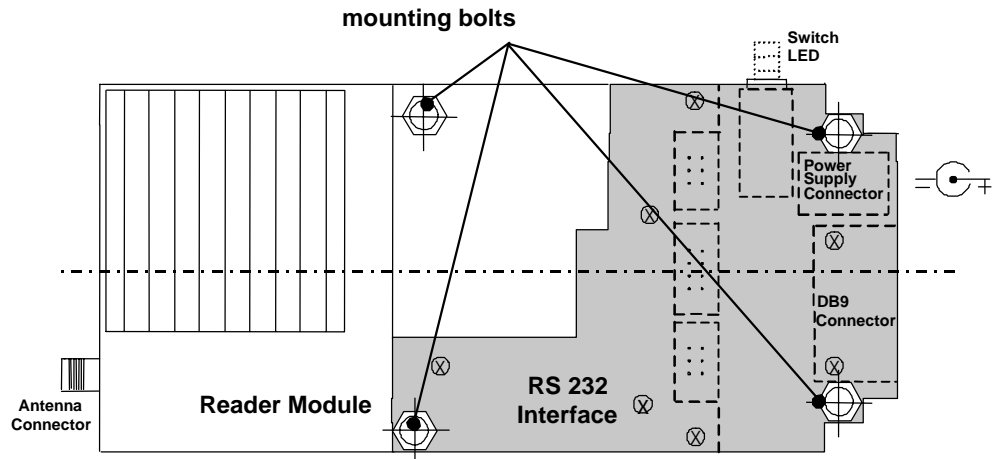
Tag-it Navigator is a tool, which can be used for reader setup, tuning, or diagnosis. Additionally, it can log transponder responses for initial experimentation and testing with the Tag-it System. It provides data and time information, and can display the acquired data in a number of different formats.

The Tag-it Navigator can be obtained from your nearest TIRIS Sales Office, or downloaded from the TIRIS Web Site <http://www.tiris.com>.

### 3.4.2 Mounting

- Place the Reader Module carefully into or onto the object or housing that has been prepared with holes for the mounting bolts.
- Secure the Reader Module to the object/housing using the four screws for the mounting bolts.

**Figure 14: Mounting Bolts (RI-R00-321A)**



#### **WARNING:**



**THE HEAT SINKS OF THE READER MODULE CAN GET HOT (APPROXIMATELY 80°C). THEREFORE, BE CAREFUL NOT TO TOUCH THE HEAT SINKS WHEN THE READER IS TURNED ON. HANDLE THE READER MODULE WITH CARE TO AVOID BEING BURNED.**

**MAKE SURE YOU HAVE SELECTED PROPER MOUNTING MATERIALS, WHICH WITHSTAND THESE TEMPERATURES.**

### 3.4.3 Attaching Cables

- Connect the data communication cables to connectors J2 and J3.
- Attach the antenna.
- Attach the power supply.

#### **CAUTION:**



**Make sure the power supply is switched to “OFF” before connecting the power cable.**

**Connector misalignment can damage the Reader Module.**

### 3.4.4 Transmitter Output Power

The reader output power can be adjusted by potentiometer R3. The location of potentiometer R3 is shown in Figure 15.

Perform the following steps in order to achieve proper hardware and software conditions:

- Connect the 50  $\Omega$  dummy load to the SMA antenna connector.
- Switch power at PC and Reader Module to "On".
- Start the software, for example: "Tag-it Navigator".
- Set command "Transmitter" to "On" Continuous Wave (CW).
- Measure peak-to-peak voltage across the dummy load with scope at impedance of 1 M $\Omega$ .
- Calculate the transmitted power regarding the following equation:

$$P = V_{\text{eff}}^2 / R \Rightarrow V_{\text{pp}} = 2.82 \sqrt{(P \cdot 50 \Omega)}$$

Table 7 shows some approximate reference values that can be expected.

**Table 7: Reference values for tuning the Reader Module (RI-R00-321A)**

Voltage (Vpp)	6.30	14.1	19.9
Power in mW	100	500	1000

**Figure 15: Location of Potentiometer R3 (RI-R00-321A)**



# Technical Data

This chapter provides the technical specifications of the Tag-it Reader Modules. It also provides information about packing and storage.

Topic	Page
4.1 Specification Summary .....	24
4.2 Packing .....	25
4.3 Storage.....	25

## 4.1 Specification Summary

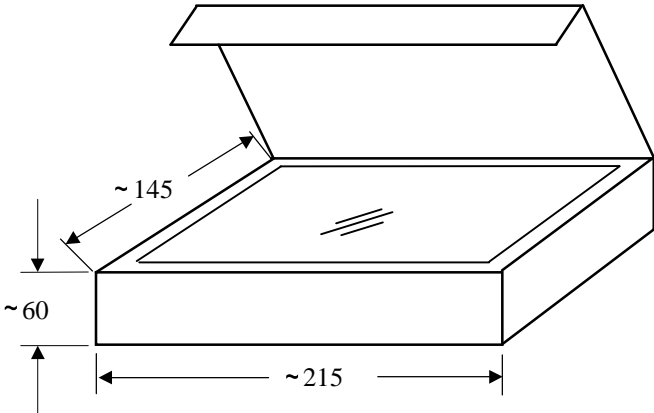
Electrical Data		
Operating frequency		fc: 13.56 MHz
RF power output		100 mW to 1.1 W adjustable
Power change over operating temperature range		2dB max.
Antenna bandwidth		1 MHz @-3dB
Antenna impedance		50 Ω at 13.56 MHz
Return loss		20dB or better (VSWR<1:1.222)
Maximum antenna cable length		15 meters
Transmitter modulation		Pulse width coded, AM 100%; on-off ratio greater 40dB
Receive frequencies and bit modulation		Manchester coded A = fc ± 423.75 kHz; B = fc ± 484.29 kHz Low bit: transition A to B. High bit: transition B to A.
Receiver sensitivity		Better -60dBm@20dBs/n; bit error rate 10 <sup>-4</sup>
Operating Voltage		12V ± 5%
Current consumption @12V:	Active	850 mA@800 mWatt RF-output
	Stand-by (transmitter off)	650 mA
Control module		
Digital Signal Processor		DSP TMS320F206
Flash EEPROM		32K x 16
S-RAM		4.5K x 16
Communication ports		
	RI-R00-320A	RI-R00-321A
Asynchronous serial port	up to 57,600 bits/s 19,200 bits/s implemented	up to 38,400 bits/s 19,200 bits/s implemented
Expansion port (RI-R00-320A)	for reader synchronization	-
Connectors		
Antenna	SMA socket, 50 Ω, 90° angle	SMA socket, 50 Ω, 90° angle
Power	J1: 6-pin double row header, vertical, pitch 2.54 mm	Low voltage, ØPin 1.9 mm, Ø 6.6 mm, depth 14 mm
	J2: 6-pin double-row header, vertical, pitch 2.54 mm	RS232: 9-pin, male
	J3: 8-pin double-row header, vertical, pitch 2.54 mm	
Environmental Data		
Operating temperatures	-20 to +55°C (including self-generated heat)	
Storage temperatures	-40 to +80°C	
Vibration	Suited for static application	
Overall Dimensions (excluding connectors and switch protrusions)		
	126 x 73 x 43 mm (± 1 mm)	160 x 73 x 43 mm (± 1 mm)
Weight	170 g	220 g



## 4.2 Packing

The Tag-it Reader Modules are shipped in anti-static bags and standard packing boxes. The data provided below should only be viewed as guide values.

**Figure 16: Packing**

	1	<b>Reader Module 320A</b> 220 mm x 120 mm x 90 mm  Weight: ~ 0.4 kg
	2	<b>Reader Module 321A with RS232 Interface</b> 220 mm x 120 mm x 90 mm  Weight: ~ 0.5 kg

## 4.3 Storage

The following rules must be applied when storing the Tag-it Reader Modules for long periods:

- Store only in dry rooms.
- Storage temperature is -40°C to +80°C.

# Regulatory, Safety and Warranty Notices

This chapter provides important information about regulatory constraints and safety precautions.

Topic	Page
<b>5.1 Regulatory Notes .....</b>	<b>27</b>
5.1.1 FCC Notices (U.S.A.) .....	27
5.1.2 ETSI Conformity .....	27
5.1.3 CE Conformity .....	27
<b>5.2 Safety Precautions.....</b>	<b>28</b>
5.2.1 Human Safety .....	28
5.2.2 Application Restrictions.....	28
5.2.3 ESD Safety Information.....	29
<b>5.3 Warranty and Liability.....</b>	<b>29</b>

## **5.1 Regulatory Notes**

An RFID system comprises an RF transmission device, and is therefore subject to national and international regulations.

TI has obtained approvals for this equipment from approval authorities in a number of countries and is continuing to apply for approvals in further countries. Actual status for a given product can be advised by TIRIS Sales Offices.

A system containing these reader boards may be operated only under an experimental license or final approval issued by the relevant approval authority. Before any such device or system can be marketed, an equipment authorization must be obtained from the relevant approval authority.

### **5.1.1 FCC Notices (U.S.A.)**

A demo reader system RI-K01-320A containing Series 6000 Reader Boards (RI-R00-321A) has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. It is the responsibility of the system integrators to get their complete system tested and to obtain approvals from the appropriate local authorities before operating or selling this system.

### **5.1.2 ETSI Conformity**

A demo reader system RI-K02-320A containing Series 6000 Reader Boards (RI-R00-321A) has been tested and found to comply with the European standard EN300330. It is the responsibility of the system integrators to get their complete system tested and to obtain approvals from the appropriate local authorities before operating or selling this system.

### **5.1.3 CE Conformity**

A CE Declaration of Conformity is available for this Tag-it system at TIRIS Sales Offices.

Any device or system incorporating the Tag-it reader system, in full or in part, in any other than the originally tested configuration needs to be verified against the European EMC directive 99/5/EC. A separate Declaration of Conformity must be issued by the System Integrator or user of such a system prior to marketing and operating it in European Community.

## 5.2 Safety Precautions

### 5.2.1 Human Safety

A Tag-it system RI-K02-320A (based on reader module RI-R00-321A, adjusted to 800 mW) has been tested against the following standards regarding human safety in electromagnetic fields, including the effect on persons wearing implanted pace makers:

- DIN VDE 0848, part 2
- IEEE / ANSI C95.1-1991

TÜV Product Service has confirmed that the tested system meets the requirements in accordance with these standards.

In case of RI-K02-320A the operator of the system needs to install means that prevent exposure of persons to the antenna field at distances of less than 45 cm. This addresses the unlikely case of impact on old pace makers that have not been produced according to current standards (EN 50061/A1). In other cases, a distance of 20 cm is sufficient.



#### **WARNING:**

**CUSTOMERS USING THE TAG-IT READER BOARDS ARE RESPONSIBLE FOR OPERATING THEIR SYSTEM UNDER IMPLEMENTED POWER LEVELS AND ANTENNA CONFIGURATIONS AGAINST RELEVANT STANDARDS FOR HUMAN SAFETY IN ELECTRONIC FIELDS. ANY IMPLEMENTATION OF THE SYSTEM THAT VARIES FROM THE TESTED CONFIGURATION (E.G. CHANGES IN ANTENNA SIZE OR POWER OUTPUT) ARE KNOWN TO IMPACT CONFORMANCE AND MUST BE RE-TESTED TO ASSURE SAFETY.**

---

### 5.2.2 Application Restrictions



#### **CAUTIONS:**

**These reader boards are designed for integration in application systems for static installation. Prevention of vibration is strongly recommended.**

**When integrating these boards into housings appropriate means of cooling may be necessary in order to prevent that the combination of environmental temperature and heat generated by the reader board will not exceed the specified operating temperature.**

---

### 5.2.3 ESD Safety Information

The Reader Module is packed in special anti-static envelopes, which protect against electrostatic charge that could cause damage.

- Handle the Reader Module carefully and keep it in the protective envelope until you are ready to install it.
- Whenever possible, handle the Reader Module by its edges or frame.

## 5.3 Warranty and Liability

The “General Conditions of Sale and Delivery” of Texas Instruments Incorporated or a TI subsidiary apply. Warranty and liability claims for defect products, injuries to persons and property damages are void if they are the result of one or more of the following causes:

- improper use of the Reader Modules
- unauthorized assembly, operation and maintenance of the Reader Modules
- operation of the Reader Modules with defective and/or non-functioning safety and protective equipment
- failure to observe the instructions during transport, storage, assembly, operation, maintenance and setting up of the Reader Modules
- unauthorized changes to the Reader Modules
- insufficient monitoring of the Reader Modules' operation or environmental conditions
- improperly conducted repairs
- catastrophes caused by foreign bodies and acts of God.

# **Terms & Abbreviations**

---

---

---

The terms and abbreviations used in this manual can be found in the TIRIS Terms and Abbreviations Manual - document number 11-03-21-002. This manual can be found via our home page:

<http://www.tiris.com>