





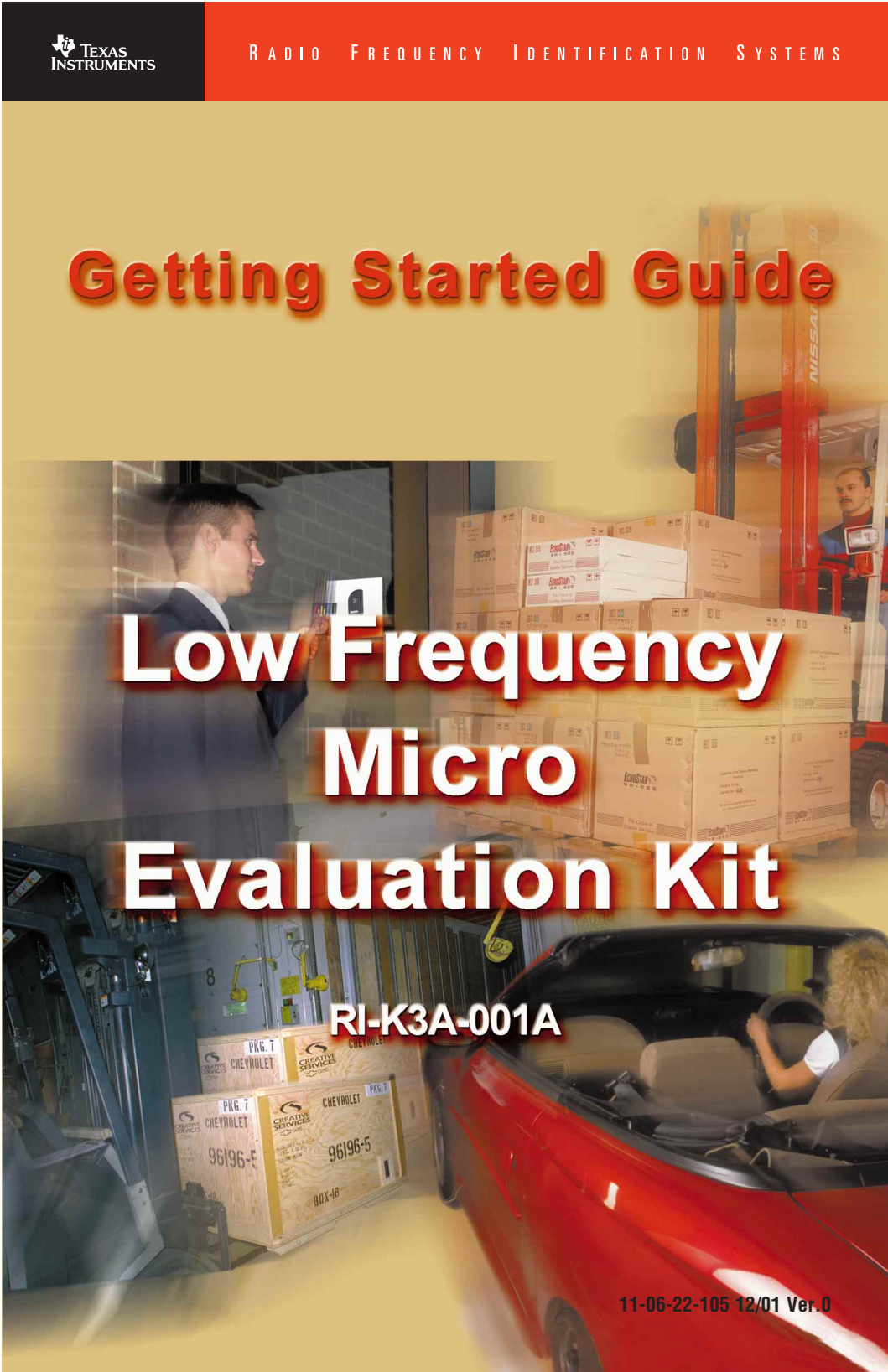
RADIO FREQUENCY IDENTIFICATION SYSTEMS

# Getting Started Guide

# Low Frequency Micro Evaluation Kit

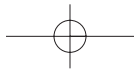
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## Getting Started Guide

Thank you for your recent purchase of the *Low Frequency Micro Reader Evaluation Kit*. This LF Micro Reader Evaluation Kit enables designers to rapidly develop their unique applications using the capabilities of Texas Instrument's 134kHz Radio Frequency Identification (RFID) technology. We're pleased to be taking the lead in inspiring new uses for RFID technology by supplying this tool for developing applications.

This *Getting Started Guide* includes simple step-by-step instructions to allow you to easily assemble and use the kit. A more complete instruction manual is included inside the Demo CD and also available on our website at **www.ti-rfid.com**.

*Please contact our technical support service if you have any questions. Email to [rfidsupport@ti.com](mailto:rfidsupport@ti.com) or in the US call toll-free 1-888-937-6536 or for international customers call +1 (972)-575-7518 Monday through Friday 8am-5pm CST.*

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## 1. General

The LF Micro Reader Evaluation kit includes a sample of nine TI\*RFID transponders with different form factors, read ranges and data functionality. Please see the Products section of our web site for the complete family of transponders. The data functionality of the transponder will allow the user to do the following:

### Functionality Description

**RO = Read Only:** The transponder has a factory programmed unique 64 bit number that cannot be reprogrammed.

**R/W = Read/Write:** The transponder can be reprogrammed by the user as often as required or can be locked to turn data into read only. Memory size is 80 bits.

**MPT = Multipage Transponder:** Similar to R/W transponder but with increased memory size to 1360 bits. The memory is organized into 17 pages; each page has 80 bits of memory.

**SAMPT = Selective Addressable Multipage Transponder:** Selective addressable allows a user to read or program a single transponder in a group of transponders.

**DST = Digital Security Transponders:** Features a challenge/response encryption method that allows for secure authentication.

DST transponder are not included in this kit.

### Performance Expectations

Read range performance with our low frequency product line is generally dependent upon:

1. Transponder type or size
2. Read out antenna type or size
3. Possible electronic interference sources in the environment that may be running on the same frequency or have harmonic frequency noise.

The LF Micro Evaluation kit was designed for applications that need compact, low-cost reader design with short read range.

## 2. Content

The Evaluation Kit includes the following components:



Figure 1 Low Frequency Micro Reader Evaluation Kit

Pos.	Qty.	Device
1.	1	32mm Glass Transponder SAMPT (RI-TRP-IR2B)
2.	1	23mm Glass Transponder R/W (RI-TRP-WRHP)
3.	1	12mm Wedge Transponder R/O (RI-TRP-R9WK)
4.	1	85mm Disk Transponder R/W (RI-TRP-W9UR)
5.	1	30mm Disk Transponder R/O (RI-TRP-R9QL)
6.	1	Mount-on-Metal Transponder R/O (RI-TRP-R9VS)
7.	1	120mm Cylindrical Transponder R/O (RI-TRP-R9TD)
8.	1	Card Transponder R/W (RI-TRP-W4FF)
9.	1	Keyfob R/O (RI-TRP-RFOB)
10.	1	S2000 Micro Reader (RI-STU-MRD1) with interface board and antenna.
11.	1	Serial Data Cable
12.	1	Resource/Software CD
13.	1	International Power Supply (Multiple Connectors)
14.	1	Getting Started Guide

## 3. ESD Safety Information

The Micro Reader is packed in a special antistatic bag to protect it from static charge that could cause damage.

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

## 4. Installation

### 4.1 Interface Cable

- Connect the serial data cable (11) with the serial interface connector mounted on the control board of the S2000 microreader (10).
- Connect the 9-pin DB plug of the serial data cable (11) to the serial port of a computer.

### 4.2 Power Supply

- Connect the output connector of the Power Supply (13) to the reader interface board and connect the power supply to Main Power.
- The red LED on the reader should be flashing.

#### Caution:

The input tip on the power supply must be set at positive tip or interior output voltage. TI warranty does not cover damage to the reader unit caused by reverse voltage polarity. Check that the arrow on the tip of the power supply is lined up with the (-) setting on the power supply output barrel for negative barrel but positive tip voltage.

### 4.3 Software Installation

#### System requirements:

- 5MB available space on hard disk
- Windows 95, 98, NT, 2000

The software TIRIS Reader Manager S2\_UTIL Version 1.20 can be downloaded from the resource CD under the directory "Software" or the website at:

<http://www.ti.com/tiris/docs/products/tools.htm>

S2\_UTIL Version 1.2 is a Windows based software utility program for the configuration and demonstration of our Series 2000 readers.

This program can be used with the following readers (controls modules):

- RI-STU-MB2A, RI-STU-MB6A (Software version 1.32, 1.4)
- RI-STU-251A, RI-STU-251B-00
- RI-STU-MRD1

Proceed with the following steps in order to install the Windows based software to your computer:

- Create a directory c:\(...) on your computer and download the zip-file S2\_UTIL\_VI\_20.ZIP from the Documentation / Demo CD
- Unzip the program and copy the files in your directory c:\ (...).
- Run the reader software program by selecting S2\_Util.exe.

Note:

We recommend at this time to create a short cut on your desktop in order to have quick access.

## 5. System Function Test

- Click to Menu **Main** and open **Interface**.
- Switch to **PORT** and select the reader communication port on your computer, default is **COM 1**.
- Click to **Operation Mode** and open **Micro Reader Mode**.  
*The red LED on the reader should be flashing.*  
*On the Receive Window 'Microreader Version 1.X' will appear.*
- Take one of the transponders out of the Evaluation Kit and bring it in front of the antenna.
- Click to **Line Mode**.  
*The data of the transponder will be read continuously and shown on the Receive Window. The Message Window will show the message "reading successful!"*  
*The green LED of the reader will illuminate as soon as the transponder is within the reading range of the reader/antenna set, the yellow light will be flickering. The intensity of the light depends on the noise level in the surrounding environment.*
- For a single reading test please click to **Single Read** while keeping the transponder within the reading range.  
*The green LED of the reader will illuminate as soon as the transponder is within the reading range of the reader/antenna set*  
*The data (ID) of the transponder will be read once and shown on the Receive Window. The Message Window will show the message "reading successful!"*.

Note:

For different reader software settings refer to the -On Line Help- files located in the main menu of the reader program.



## 6. References

### Manuals

For detailed specification on each item in the LF Micro Reader Evaluation Kit please refer to the documentation provided on the CD included with this kit, or look inside the -Document Center- on our RFID Systems Web Site at: <http://www.ti-rfid.com>

1. Series 2000 Reader System, Reference Guide 11-06-21-027  
Micro-reader RI-STU-MRD1
2. Series 2000 Micro Reader, Data Sheet 11-06-22-069  
Micro-reader RI-STU-MRD1

## 7. Regulations

The LF Micro Reader Evaluation kit comprises a RF transmission device, and is therefore subject to national and international regulations. TI has obtained approvals from approval authorities in a number of countries and is continuing to apply for approvals in further countries. Actual status can be advised by customer support. In countries where approval has not been obtained, this system may be operated only under an experimental license issued by the relevant approval authority and must not be marketed. Before any such device or system can be marketed, an equipment authorization must be obtained from the relevant approval authority.

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

The Federal Communications Commission, FCC, has imposed approval requirements on all intentional radiator equipment. This TI product complies with FCC rules Part 15, Subpart C, "Intentional Radiator" Paragraph 15.207 "Conducted Limits" and 15.209 "Radiated Emissions Limits; General Requirements". FCC certification is required for systems and the customer is responsible for meeting those restrictions and obtaining approval for their system from the FCC. The intentional radiators are labeled according to the FCC with the following label:

FCC ID: A92LFMICROEVALKIT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The LF Micro Evaluation Kit complies with Paragraph 15.203 "Antenna Requirement," which states "[a]n intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. If the customer changes the antenna, he or she should refer to section 2.803." In addition to the required regulations on intentional radiators, in keeping with sections 15.21 and 15.105 for the FCC rules, TI is informing the user of the following:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's expense.

Notice: Modifications to this device will void the authorization granted under Federal Communications Commission Rules permitting the operation of this device. If modifications to the product are made, the customer is responsible for obtaining FCC approval. For more information regarding the FCC regulations please refer to the following websites:

[http://www.access.gpo.gov/nara/cfr/waisidx\\_98/47cfr15\\_98.html](http://www.access.gpo.gov/nara/cfr/waisidx_98/47cfr15_98.html)  
<http://www.fcc.gov/>

**CE Conformity (Europe)**

A CE Declaration of Conformity is available for the Reader RI-STU-MRD1 at TI\*RFID Sales Offices.

The equipment complies with the essential requirements of the Telecommunication Terminal Equipment Act (FTEG) and the R&TTE Directive 99/5/EC when used for its intended purpose.

Any device or system incorporating this module in any other than the originally tested configuration needs to be verified against the requirements of the Telecommunication Terminal Equipment Act (FTEG) and the R&TTE 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 it and operating it in the European Community.

It is the responsibility of the system integrators to get their complete system tested and obtain approvals from the appropriate local authorities before operating or selling the system.

## 8. Troubleshooting

For customer and technical support email to [rfidsupport@ti.com](mailto:rfidsupport@ti.com) or telephone at +972-575-7518 or Toll Free for US at 1-888-937-6536.

Item	Problem	Verification
Power	- No reader function (Red LED does not flash)	<ul style="list-style-type: none"> <li>• Ensure that               <ul style="list-style-type: none"> <li>- all plugs are connected</li> <li>- main power is connected properly on power supply.</li> </ul> </li> <li>• Plugging the power supply into a power strip can result in power spikes that cause the unit not to function properly.</li> </ul>
Communication	- Software does not recognize reader - No read / write function - Intermittent read / write function of the reader	<ul style="list-style-type: none"> <li>• Ensure that               <ul style="list-style-type: none"> <li>- all cables are connected properly.</li> <li>- interface port at PC is set properly.</li> </ul> </li> </ul>
Antenna	- Low read / write range - Intermittent read / write function	<ul style="list-style-type: none"> <li>• Ensure that the wire ends of the antenna are fastened to the S2000 Micro Reader IF Board.</li> <li>• Change the environment around the antenna and reader to check for possible interference. Typically, interference can emit from computer video displays and metal beneath surfaces.</li> </ul>
Transponder	- No read / write function	<ul style="list-style-type: none"> <li>• Move transponder closer to antenna and try different orientations of the transponder.</li> <li>• Replace transponder and try once again.</li> </ul>

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