TEXAS INSTRUMENTS

Antenna Tuning Indicator

RI-ACC-ATI2

Reference Guide

11-06-21-030 May 2001

Edition One - May 2001

This is the first edition of this manual, it describes the following equipment:

TIRIS Antenna Tuning Indicator **RI-ACC-ATI2**

Read This First

About This Guide

This manual describes the TIRIS Antenna Tuning Indicator (ATI), it provides the information that you will need in order to use the ATI to help tune your antenna and reader system to resonance. It is generally targeted at systems integrators or value added resellers.

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

Application Centers are located in Europe, North and South America and the Far East to provide direct support. For more information, please contact your nearest TIRIS Sales and Application Center. The contact addresses can be found on our home page:

http://www.ti-rfid.com

Document Overview

List of Figures

1. General

This document describes how to use the TIRIS Antenna Tuning Indicator (ATI) RI-ACC-ATI2 to tune antennas connected to a TIRIS Radio Frequency Module (RFM) RI-RFM-007B or RI-RFM-104B to resonance.

1.1 Product Description

The Antenna Tuning Indicator is a tool which simplifies the resonance tuning of the antenna (Section 2.2) and the adjustment of the RXSS- (Section 2.3) synchronization level for wireless read cycle synchronization. It indicates exactly what to do during the antenna tuning procedure. In addition to that, the output of the RF Module field strength detector is indicated (RXSS-level) for EMI control.

2. Operating Instructions

2.1 How to Connect the Antenna Tuning Indicator to the RF Module

The ATI is connected directly to the RF Module via the ATI connector on the RF Module (see Figure 1). It does not need a separate power supply. It can be connected to the RF Module even if the module is already connected to the Control board.

Note:

Because the ATI overwrites the TXCT- signal generated by the Controller, transponders cannot be read as long as the ATI is connected to the RF Module.

Connect the ATI to the RFM as follows:

* Switch the RF Module power supply off.
* Connect the ATI to the RF Module as indicated in Figure 1.
* Switch the power supply on.

WARNING:

CARE MUST BE TAKEN WHEN HANDLING THE RFM. THERE IS HIGH VOLTAGE ACROSS THE ANTENNA TERMINALS, AT THE TUNING COIL AND AT SOME PARTS OF THE PRINTED-CIRCUIT BOARD (PCB). THE HIGH VOLTAGE COULD BE HARMFUL TO YOUR HEALTH!

IF THE ANTENNA INSULATION IS DAMAGED IT SHOULD NOT BE CONNECTED TO THE RFM.

2.2 Tuning the Antenna to Resonance

The antenna is tuned by adjusting the resonance frequency of the antenna resonator circuit to 134.2 kHz. This can be done by changing the inductance of a tuning coil on the Radio Frequency Module (RI-RFM-007B or RI-RFM-104B), or by adjusting the capacitance of the resonance circuit on the RFM. Screwing the ferrite core of the coil in increases the inductance and screwing the core out decreases it. The LEDs on the ATI indicate whether you should screw the core in or out, or increase or decrease the capacitance. The green LED indicates correct tuning.

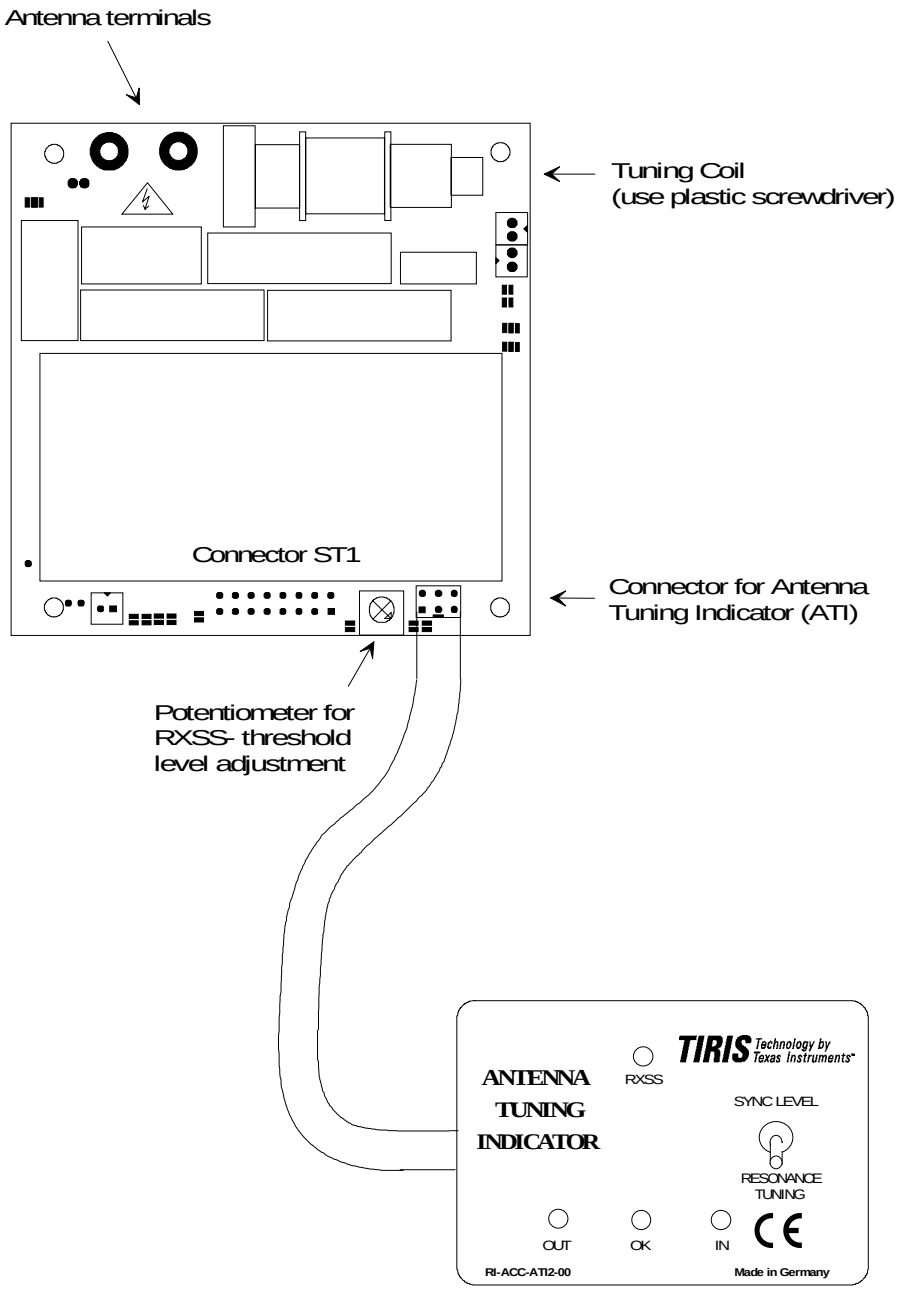

Figure 1: Top View of the ATI Connected to the RFM

Tune the antenna to resonance as follows:

* Set the switch on the ATI to the position 'RESONANCE TUNING'. The RF Module will start transmitting.
* If the left LED (red) indicates 'OUT':
  On the S2000 RFM - screw the ferrite core out (with the plastic screwdriver provided).
  On the Power RFM - decrease the capacitance.
* If the right LED (red) indicates 'IN':
  On the S2000 RFM - screw the ferrite core in (with the plastic screwdriver provided).
  On the Power RFM - increase the capacitance.
* When the green LED indicates 'OK', the antenna is tuned to resonance.

==> The antenna tuning is complete.

2.3 Adjusting the RXSS Threshold Level

In order for wireless read cycle synchronization to work correctly the RXSS-threshold level must be adjusted by means of the potentiometer built into the RFM. This potentiometer is located on the upper side of the RFM, next to connector ST-1 on the S2000 RFM (see Figure 1), or next to J1 on the Power RFM.

To adjust the RXSS- threshold level, please proceed as described below.

CAUTION:

Please be careful not to overwind the potentiometer at either of the end stops.

Adjustment of the RXSS- level must be done individually for each antenna and RF Module, according to the following procedure:

* Set the switch on the ATI to 'SYNC LEVEL'.
* Turn the potentiometer fully counter-clockwise (left-hand stop).
* Ensure that no other reading units are transmitting.
* Eliminate noise sources as much as possible.
* Monitor the RXSS- LED on the ATI.
* Turn the potentiometer on the RF Module clockwise, until the RXSS-LED is just statically off (using the plastic screwdriver provided with the RFM/Reader for this purpose).

2.4 How to disconnect the Antenna Tuning Indicator

Disconnect the ATI from the RFM as follows:

* Switch the RF Module power supply off.
* Disconnect the ATI.
* Switch the power supply on again.