TIAMIS-800 wireless radio transceiver

Installation Manual

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The Tiamis-800 Wireless Data Transceiver is made in the United States of America.
Printed in the United States of America.

Revision history

Revision	Released	Firmware level covered
1.0	March, 2006	1106.i and prior, PCB Rev A2

Notice

Changes or modifications not expressly approved by Lexycom Technologies, Inc. could void the user's authority to operate this equipment.

Any and all product information in this document is subject to change without notice.

General Safety Information

Lexycom Technologies, Inc. does not recommend the use of its products in life support applications where the failure or malfunction of a component may directly threaten life or lead to an injury.

Do not operate radio equipment near electrical blasting caps or in an explosive atmosphere.

Do not operate radio transmitter unless all RF connectors are secure and any open connectors are properly terminated.

Do not allow the antenna to come close to, or touch, the eyes, face, or any exposed body parts while the radio is transmitting.

Be sure that your Tiamis-800 transceiver has been provided with sufficient DC voltage and current.

All equipment should be installed according to the manufacturer's instructions and in accordance with all regulatory agencies.

Electro Static Discharge (ESD)

Static build up can cause serious damage to electronic devices when improperly handled. Appropriate precautions should be taken when handling the transceiver(s).

FCC Notification

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.

This device must be operated as supplied by Lexycom Technologies, Inc. Any changes or modifications made to the device without the express written approval of Lexycom Technologies may void the user's authority to operate the device.

WARNING: The Tiamis-800 transceiver has the maximum transmitted output power of 1 Watt. It is required that the transmit antenna be kept at least 23 cm away from nearby persons to satisfy FCC RF exposure requirements.

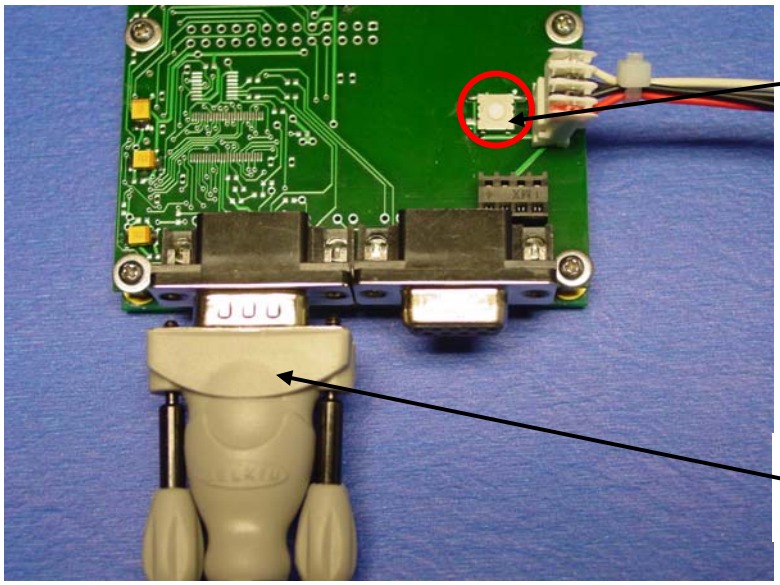
NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in the commercial installations. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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.

Electronic FCC ID

The Tiamis-800 transceiver is a Software Defined Radio transceiver (SDR). Its FCC ID label can be accessed by using a standard terminal program such as Hyper Terminal or similar.

To access transceiver's FCC ID, follow the steps below.

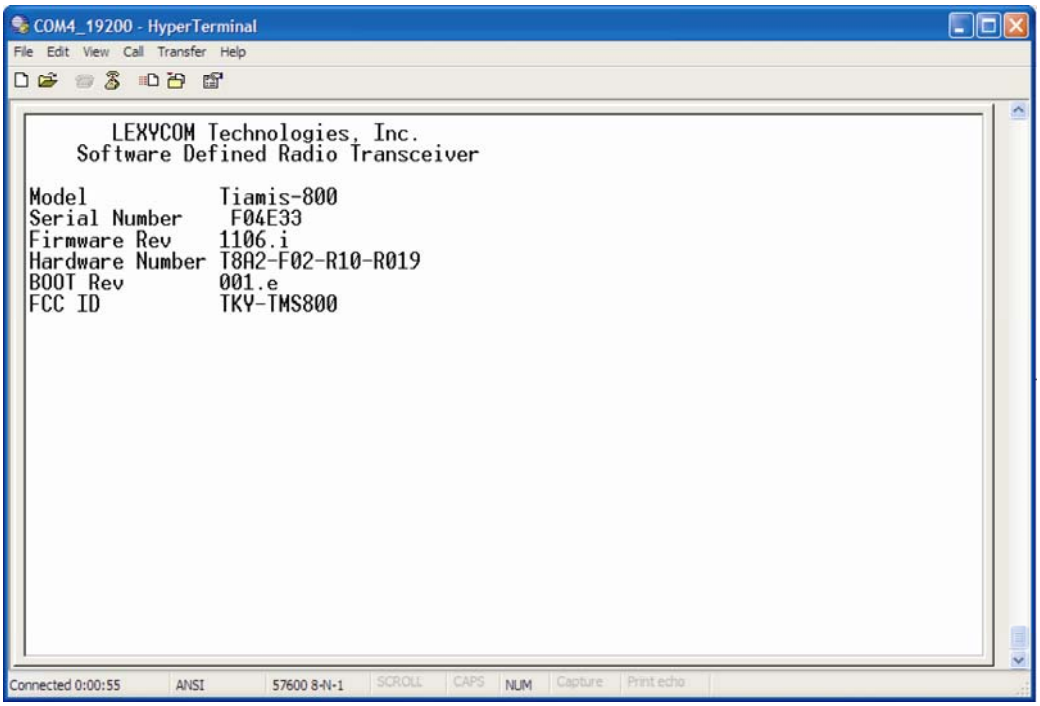
1. Connect one end of the data cable supplied to you by Lexycom to the RS232 diagnostics connector and the other end of the same cable to the programming computer's COM port.



2. Apply power to the transceiver by turning the power source On.

3. On the computer, start the Hyper Terminal or similar terminal program.

4. Push the Reset button on the interface board. The Hyper Terminal's screen will show FCC ID number (shown below).


COM4_19200 - HyperTerminal
File Edit View Call Transfer Help
LEXYCOM Technologies, Inc.
Software Defined Radio Transceiver
Model Tiamis-800
Serial Number F04E33
Firmware Rev 1106.i
Hardware Number T8A2-F02-R10-R019
BOOT Rev 001.e
FCC ID TKY-TMS800
Connected 0:00:55
ANSI
57600 8-N-1
SCROLL
CAPS
NUM
Capture
Print echo

1. Transceiver Installation

To install the transceiver follow the steps listed below.

Step 1. Install the Transceiver

Install the transceiver on a flat surface using the mounting holes in the corners of the transceiver.

Step 2. Install the Antenna

Choose the location for the antenna wisely. Generally, the higher the antenna is placed, the better RF link will be.

Keep in mind that the antennas close by to your antenna might potentially create interference. Avoid locating your antenna in close proximity to other RF equipment.

WARNING: *Any antennas placed outdoors must be properly grounded. Use extreme caution when installing antennas and follow all instructions included with the antennas.*

Step 3. Install the Antenna Feedline

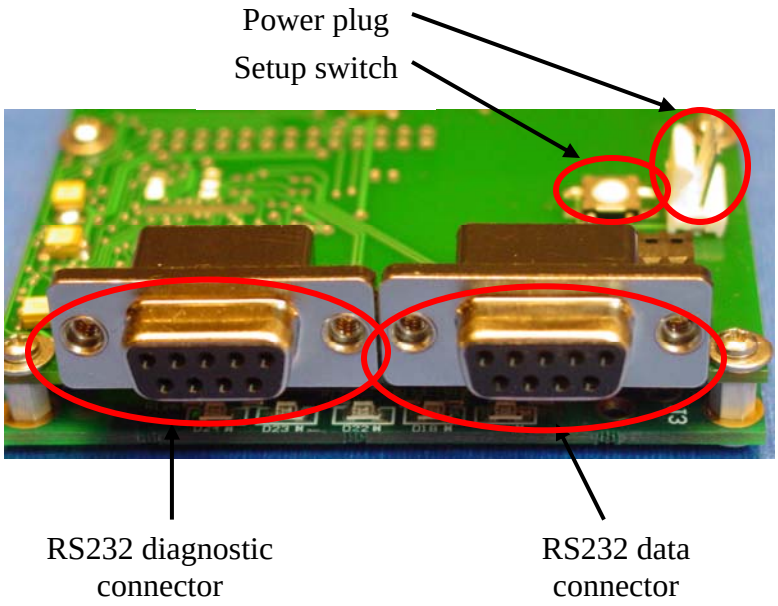
Depending upon the application, this step usually involves a preparation and manufacturing of a conduit for the antenna feeder line, routing the feeder, and assuring the proper feeder line terminations.

When done, connect antenna's feedline to the transceiver's RF connector.

Step 4. Install the Power for the Transceiver

Connect the four pin power cable to the power plug on the interface board to the Tiamis-800 radio with the power adaptor and the four pin power shown on the picture below.

Caution: *The red wire on the four pin power cable should be the closest to the RS232 data connector (see picture below).*



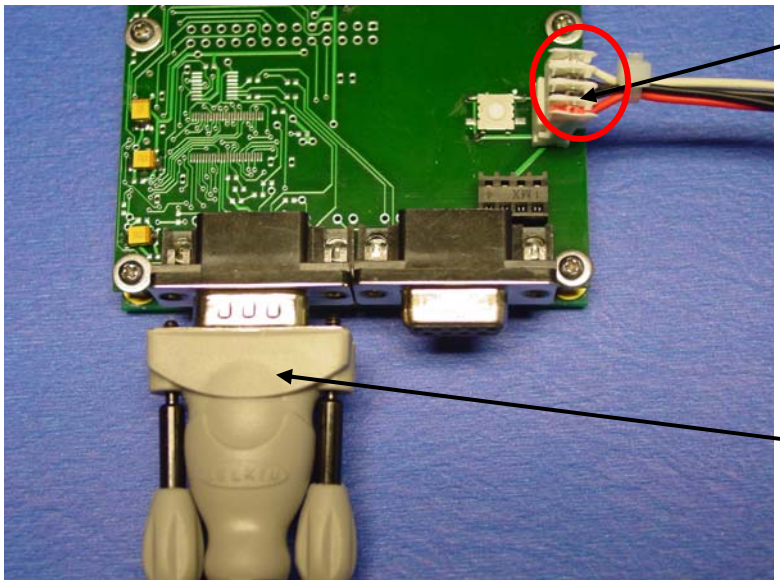
Make sure that your power source is adequate to power up the transceiver.

WARNING: *The Tiamis-800 transceiver is design to operate in the negative ground systems only.*

Connect the red wire of the four pin power cable to the positive terminal of your power source. Connect one of the black wires of the four pin power cable to the ground terminal of your power source cable.

Step 5. Connect Computer to the Transceiver

Connect one end of the data cable supplied to you by Lexycom to the RS232 diagnostics connector Tiamis-800, on the interface board. Connect Data port 1, the other end of the same cable to the programming computer's COM port.



WARNING: Polarity of this connector is very important!

If reversed, the transceiver may be permanently damaged.

Data cable is connected to the RS232 diagnostics port.

Apply power to the transceiver by turning the power source On.

2. Transceiver Configuration

When purchased, the Lexycom wireless data transceivers are shipped from the factory pre-configured to operate in the Slave mode of operation with the acknowledgement turned off. The most of the factory default settings can be left unchanged.

However, some of the settings need to be verified and changed (if needed) during the transceiver's installation.

NOTE: *It is installer's responsibility to ensure that the Tiamis-800 transceiver is installed according to the guidelines listed below depending on the system configuration.*

It is also installer's responsibility to assure that the transceiver's emission limits are not exceeded.

Therefore, please follow the steps listed below to assure transceiver's proper installation.

Step 1. Determine the Signal Loss in your Antenna Cable

This step is required to assure that the transceiver's emission limits are not exceeded when it is used in combination with different cables and antennas.

WARNING: *If a directional antenna is used, follow the steps below to adjust transceiver's output power to assure its compliance with the FCC Rules and Regulations.*

To properly set output power of the transceiver, you need to know signal loss in the antenna cable. The cable loss depends on the cable type and its length. Lexycom Technologies provides two types of cables: LMR240 and LMR400. You can use Tables 6.1.1 and 6.1.2 below to find the loss in your cable.

Table 1. LMR240 cable loss at 915 MHz.

LMR240 cable length	LMR240 cable loss @ 915 MHz
10 feet	0.8 dB
50 feet	3.8 dB
100 feet	7.6 dB
200 feet	15.2 dB

Table 2. LMR400 cable loss at 915 MHz.

LMR400 cable length	LMR400 cable loss @ 915 MHz
50 feet	2 dB
100 feet	3.9 dB
200 feet	7.8 dB

Below is the list of antennas, which are approved for the use with the transceiver.

Table 3. List of omnidirectional antennas approved for the use with the Tiamis-800 transceivers.

Antenna manufacturer	Manufacturer's Part Number	Lexycom's Part Number	Gain	Notes
Astron Wireless	V9183	FGAN0905OS	5 dB	
Redial/Larsen	SPDA24918	FGAN0900PD	2 dB	
Astron Wireless	AXH92SMS	FGAN0900PA	0 dB	
Astron Wireless	AXH92SM	FGAN0900PS	0 d	

Table 4. List of directional antennas approved for the use with the Tiamis-800 transceivers..

Antenna manufacturer	Manufacturer's Part Number	Lexycom's Part Number	Gain	Notes
Astron Wireless	918-3	FGAN0903YS	7 dB	3 element Yagi
Astron Wireless	918-6	FGAN0906YS	11 dB	6 element Yagi
Astron	918-6ESP	FGAN0906YE	11 dB	6 element Yagi

Wireless				

Step 2. Determine the Maximum Allowed Transceiver's Output Power Settings

According to the FCC Rules, the Tiamis-800 transceiver's output power should be set to assure that the total EIRP of the system does not exceed 36 dBm.

Therefore, if the transceiver is used with one of the omnidirectional antennas listed above, the transceiver's output power can be kept at its maximum settings of '10'.

However, if one of the directional antennas used with the transceiver, use the tables below to determine the maximum allowed transceiver's output power settings to assure its compliance with the FCC Rules and Regulations.

Table 5. 7 dB Yagi, Lexycom's PN #FGAN9183YS, LMR240 cable type

Transmitter's output power settings	Transmitter's output power, mW	Total EIRP based on the length of the LMR240 cable, mW			
		LMR240, 10 feet	LMR240, 50 feet	LMR240, 100 feet	LMR240, 200 feet
10	1000	36.2	33.2	29.4	21.8
9	900	35.7	32.7	28.9	21.3
8	800	35.2	32.2	28.4	20.8
7	700	34.7	31.7	27.9	20.3
6	600	34	31	27.2	19.6
5	500	33.2	30.2	26.4	18.8
4	400	32.2	29.2	25.4	17.8
3	300	31	28	24.2	16.6
2	200	29.2	26.2	22.4	14.8
1	100	26.2	23.2	19.4	11.8
0	1	6.2	3.2	-0.6	-8.2

WARNING. *The settings marked in red will lead to transceiver's output power to be higher than allowed by the FCC. Adjust transceiver's output power settings to assure the compliance.*

Table 6. 11 dB Yagi, Lexycom's PN #FGAN9186YS and FGAN9186YS, LMR240 cable type

Transmitter's output power settings	Transmitter's output power, mW	Total EIRP based on the length of the LMR240 cable, mW			
		LMR240, 10 feet	LMR240, 50 feet	LMR240, 100 feet	LMR240, 200 feet
10	1000	39.2	36.2	32.4	24.8
9	900	38.7	35.7	31.9	24.3
8	800	38.2	35.2	31.4	23.8
7	700	37.7	34.7	30.9	23.3
6	600	37	34	30.2	22.6
5	500	36.2	33.2	29.4	21.8
4	400	35.2	32.2	28.4	20.8
3	300	34	31	27.2	19.6
2	200	32.2	29.2	25.4	17.8
1	100	29.2	26.2	22.4	14.8
0	0	9.2	6.2	2.4	-5.2

WARNING. *The settings marked in red will lead to transceiver's output power to be higher than allowed by FCC. Adjust transceiver's output power settings to assure compliance.*

Table 7. 7 dB Yagi, Lexycom's PN #FGAN9183YS, LMR400 cable type

Transmitter's output power settings	Transmitter's output power, mW	Total EIRP based on the length of the LMR400 cable, mW		
		LMR400, 50 feet	LMR400, 100 feet	LMR400, 200 feet
10	1000	35	33.1	29.2
9	900	34.5	32.6	28.7
8	800	34	32.1	28.2
7	700	33.5	31.6	27.7
6	600	32.8	30.9	27
5	500	32	30.1	26.2
4	400	31	29.1	25.2
3	300	29.8	27.9	24
2	200	28	26.1	22.2
1	100	25	23.1	19.2
0	1	5	3.1	-0.8

Table 8. 11 dB Yagi, Lexycom's PN #FGAN9186YS and FGAN9186YS, LMR240 cable type

Transmitter's output power settings	Transmitter's output power, mW	Total EIRP based on the length of the LMR400 cable, mW		
		LMR400, 50 feet	LMR400, 100 feet	LMR400, 200 feet
10	1000	39	37.1	33.2
9	900	38.5	36.6	32.7
8	800	38	36.1	32.2
7	700	37.5	35.6	31.7
6	600	36.8	34.9	31
5	500	36	34.1	30.2
4	400	35	33.1	29.2
3	300	33.8	31.9	28
2	200	32	30.1	26.2
1	100	29	27.1	23.2
0	1	9	7.1	3.2

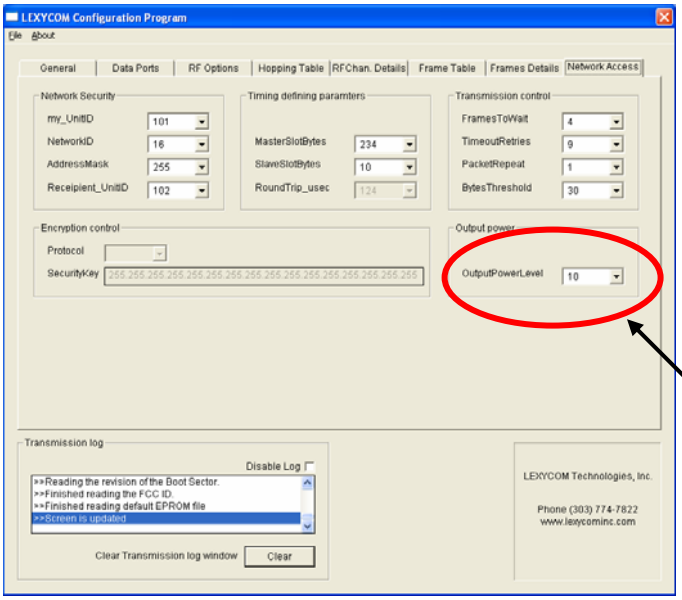
WARNING. *The settings marked in red will lead to transceiver's output power to be higher than allowed by FCC. Adjust transceiver's output power settings to assure compliance.*

Step 3. Adjust Transceiver's Output Power

To adjust the output power settings of the transceiver, start the Lexycom's Configuration Program supplied to you on a CD at the time of transceiver's purchase.

Download/read transceiver's settings (refer to the Configuration Program User Manual for more details).

When done, navigate to the *Network Access* tab. The screen for this tab is shown below.



Transceiver's output power adjustment

Locate the OutputPowerLevel menu item (shown on the picture above). Click on it and select the desired output power settings.

When done, upload all settings to the transceiver (refer to the Configuration Program User Manual for more details).