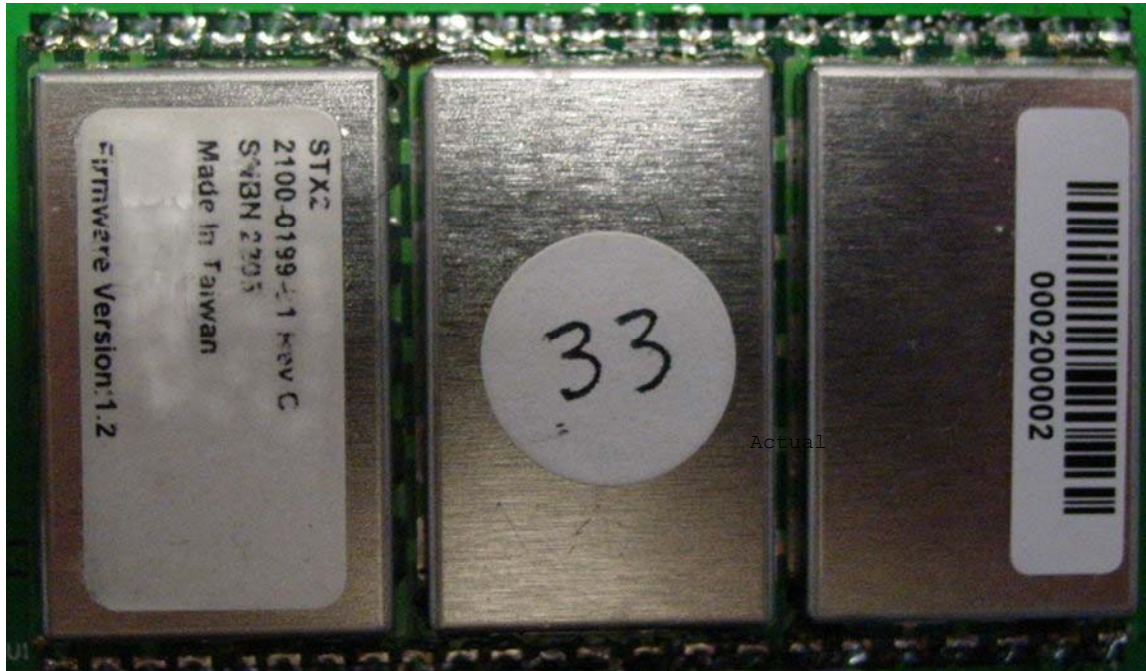




Satellite Transmitter 2

STX2 Development System

Document #9100-0142-01



USER' S MANUAL

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INTRODUCTION:

This manual provides an overview of the use and operation of the Satellite Transmitter 2 (STX2) Development System. The STX2 provides state of the art satellite communication capabilities at narrowband cost. The Development Kit contains the following components:

Contents:

Each STX2 Development System (Sales Part # 1800-0104-01) contains the following:

- ▲ 1 Satellite Transmitter 2 (#2100-0199-01)
 - ▲ 1 STX2 Development Adapters Board
 - ▲ 1 DC Power Wall Adapter
 - ▲ 1 USB Cable
 - ▲ User's Manual
 - ▲ CDROM (includes Development Software and referenced documents)
-

Features List:

Satellite Transmitter 2

- ▲ Superior communication reliability using direct sequence spread spectrum
- ▲ +18 dBm Output Power @ 100b/s with FEC Error Detection/Correction
- ▲ Excellent Jam Resistance
- ▲ FCC Approved Modular Design
- ▲ FCC ID L2V-STX2-1
- ▲ Stripline Antenna Output (50 Ohms)
- ▲ 4 Frequency Channels
- ▲ Small Physical Size And Low Power Utilization
- ▲ Patented and patent-pending technology



STX2 Development Interface Board

- ▲ USB or TTL Serial interface (jumper selectable)
- ▲ True USB Serial interface for STX2 Application Development
- ▲ Jumper Selectable Voltage Power Supply
- ▲ DC Power Wall Adapter for Development Mode
- ▲ Jumper control of STX2 power supply
- ▲ Interface block for Application Development
- ▲ Schematic included in Appendix C



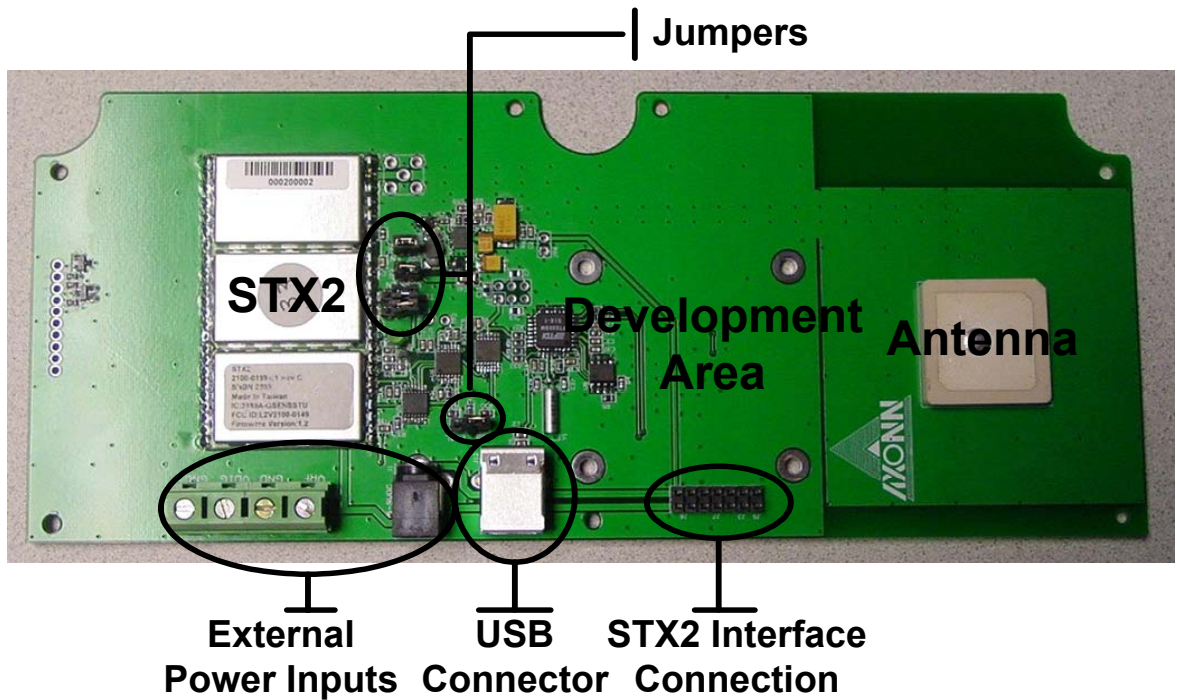


Figure 1: STX2 and Development Board

STX2 OPERATION AND BASIC USER'S GUIDE

The STX2 with the STX2 Development Board as part of the Development Assembly operates only when power is supplied by the included Power Supply and when connected to a Windows computer with a USB interface running the included development software. Instructions for use are detailed below.

Optionally, the Development Board may be powered through the barrier strip inputs with 3.3VDC to the VDIG and VRF terminals and Ground to the two GND terminals.

In order to receive messages from the STX2, the Application Development Board must be in full view of the sky. Also, the STX2 must be commissioned through the Globalstar network in order to receiver the data from Globalstar or one of the Value Added Resellers. Contact information for Globalstar and the VARs is available through Axonn.

STX2 APPLICATION DEVELOPMENT BOARD

Overview:

The Application Development Board enables the user to connect the STX2 to a personal computer (PC). The user may then use the evaluation software package provided in the STX2 Development System or write custom applications for configuring and controlling the STX2. For more information on the features of the STX2 serial protocol, see the included STX2 Data Sheet. If there are difficulties understanding the protocol, please contact Axonn L.L.C.

Hardware Configuration:

There are two electrical connections required to operate the STX2 Application Development Board. They are the 110V wall power supply adapter and the USB cable. The 110V adapter must be plugged into an available wall outlet as well as the Application Development Board. The USB cable must be plugged into the Application Development Board and an available USB port on the users PC running Windows 2000 or later operating system. Installation and operation of the software will be covered in another section of this document. Optionally, the Development Board may be powered through the barrier strip inputs with 3.3VDC to the VDIG and VRF terminals and Ground to the two GND terminals. The power supply must be capable of 1000 mA at 3.3VDC with less than 50 mV ripple.

The STX2 Application Development Board is equipped with five jumpers. These jumpers control communications with the STX2 and the setup of the on-board power supplies. Figure 2 shows the default jumper configurations.

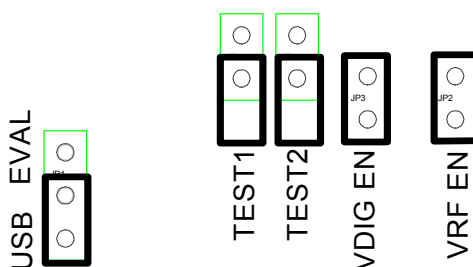


FIGURE 2: Default jumper configuration for the STX2 Application Development Board

The STX2 Development Board is intended for testing using the attached patch antenna. If other options are required for antennas, the Development Board has a mounting option for an SMA connector (J4) to allow cabling to other devices. To disconnect the patch antenna, remove resistor R8 (0 Ohm) on the back side of the board.

Table 1 below, gives a brief description of the function of the jumpers.

TABLE 1: Description of operation for STX2 Application Development Board Jumpers.

JUMPER	DESCRIPTION OF OPERATION
JP1	Switches the STX2 communications between either the USB port or the Evaluation Header. If communicating via the Evaluation 14 pin header then change the jumper setting to EVAL.
JP2	Connects the on-board 3.3V regulator to the STX2 VDIG input. Disconnect (remove jumper) if providing external power through terminal block TB1.
JP3	Connects the on-board 3.3V regulator to the STX2 VRF input. Disconnect (remove jumper) if providing external power through terminal block TB2.
JP4	TEST jumper for RF test measurements. Use in conjunction with JP5
JP5	TEST jumper for RF test measurements. Use in conjunction with JP5

Interface Connector:

The STX2 Application Development Board has a 14 pin connector interface, shown in Figure 3 below, used for development and interconnection of custom hardware onto the AXTracker. The Development Board is also designed to accept the users custom host board with mounting locations as diagramed in Figure 4 below.

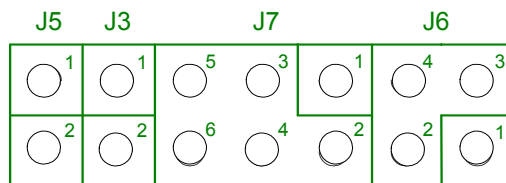


FIGURE 3: STX2 Development Board Interface Connector

The STX2 Development Board Interface connectors match up to the STX2 connectors as follows:

TABLE 2: Pin Descriptions for the STX2 Application Development Board.

STX2 Development Board Interface Connectors	Name	Description	STX2 Pins	Name
J5-1	TEST INPUT 1	Designed to be driven by an open collector/drain.	12	TEST INPUT 1
J5-2	TEST INPUT 2	Designed to be driven by an open collector/drain.	13	TEST INPUT 2
J3-1	RESET	STX2 Reset	9	RESET
J3-2	OC OUT	Designed to trigger an external high power regulator for RF transmission. Can also be used for LED Control. Limit current to 10 mA.	8	OC OUT
J7-1	GND	Ground	3 14 15 17 19-21 23-46	GND
J7-2	GND	Ground	3 14 15 17 19-21 23-46	GND
J7-3	TX SETUP	3.3V Levels <u>Logic Level</u> <u>Input Level</u> 0 < 0.8V 1 > 2.4V	5	STU TX
J7-4	SETUP INT	3.3V Levels <u>Logic Level</u> <u>Input Level</u> 0 < 0.8V 1 > 2.4V	4	STU RTS
J7-5	RX SETUP	3.3V Levels <u>Logic Level</u> <u>Input Level</u> 0 < 0.8V 1 > 2.4V	7	STU TX
J7-6	EVAL CTS	3.3V Levels <u>Logic Level</u> <u>Input Level</u> 0 < 0.8V 1 > 2.4V	6	STU CTS
J6-1	VIN	Eval Board 3.3VDC Input	----	No connect
J6-2	VDIG	Low Power 3.3V DC Input	2	VDIG
J6-3	VRF	High Power 3.3V DC Input	16 18	VRF
J6-4	N/C		No connect	

Test Modes

The test modes of the STX2 Development Board are for RF and current testing the various modes are accessed by applying the TEST jumpers and cycling power to the unit.

Table 3: STX2 Test Modes

TEST 1 Jumper	TEST 2 Jumper	Operation
Off	Off	Normal Operation
On	Off	Single Test Packet
Off	On	30 second CW Signal
On	On	30 second modulated signal

Custom Application Board:

The STX2 Development Board is intended to connect to a used designed custom application board that fulfills the needs of their application. The maximum dimensions and mounting locations for the custom board are shown in Figure 3 below. The maximum area of the custom board have been determined by the proximity of the STX2 antenna and available space inside a pre-made plastic enclosure.

FIGURE 3: Custom Application Board Dimensions

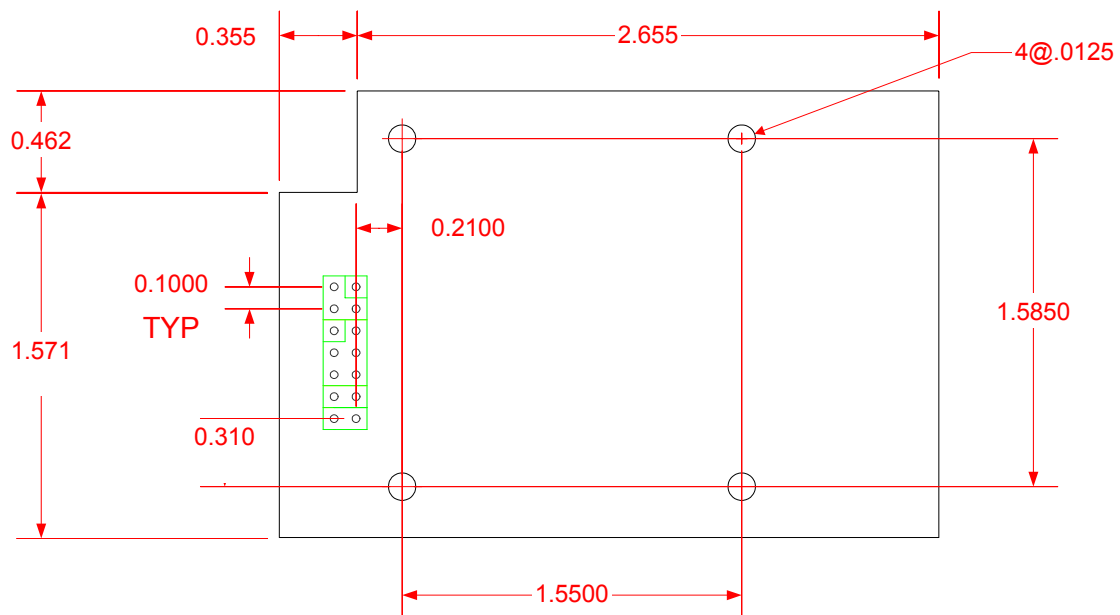
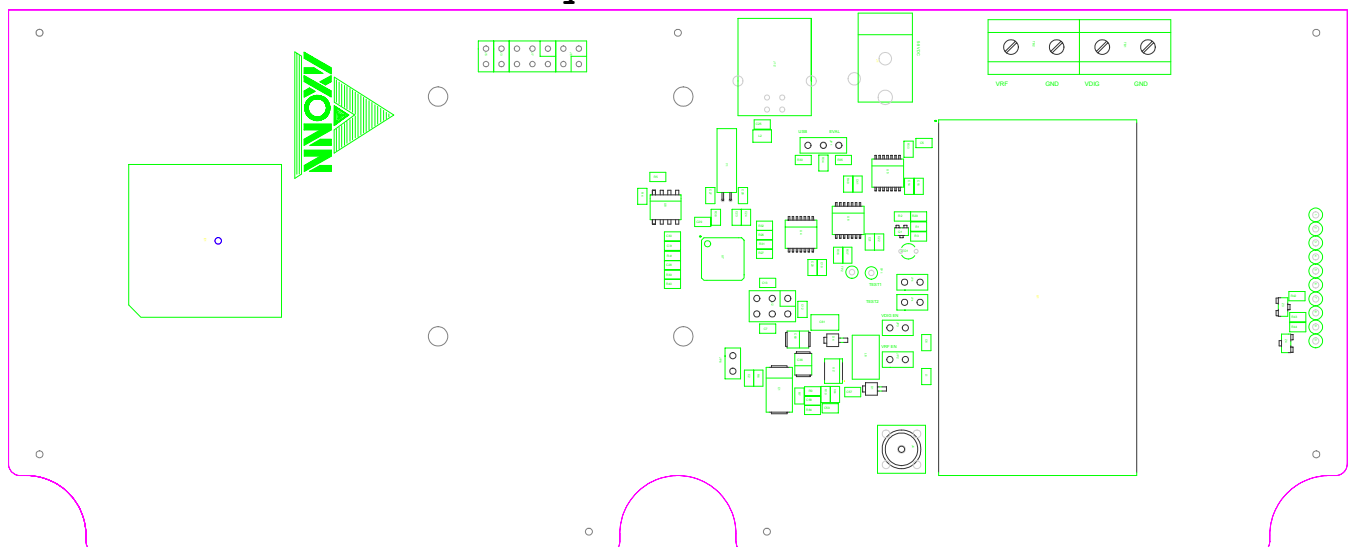


FIGURE 4: Custom host application board dimensions

Overall board layout should look as follows:



STX2 APPLICATION DEVELOPMENT SOFTWARE

Overview:

A software development CD-ROM is included in each STX2 Development System. The CD contains the STX2 Setup Tool executable as well as device drivers for the USB interface.

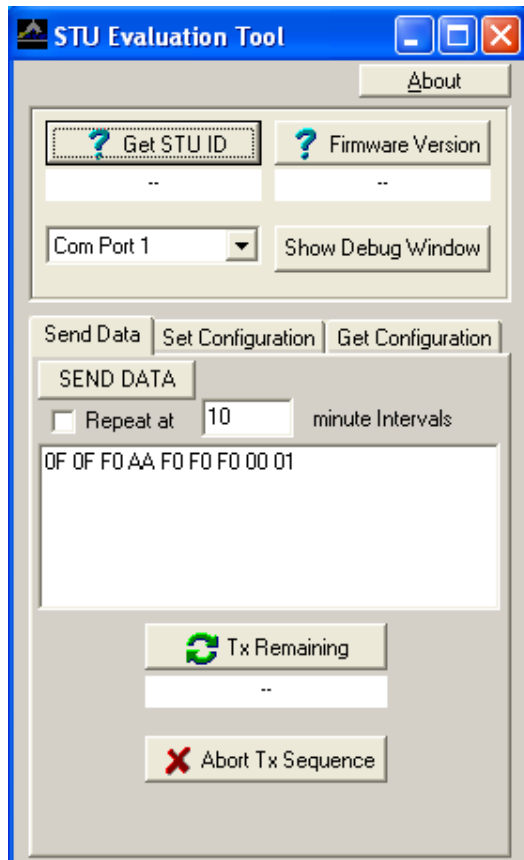
Axon Software Installation:

To operate the software programs they must be installed on a laptop or desktop PC. To Install the STX2 Setup Tool, first insert the software CD (included with your STX2 Development System) into the CD-ROM drive of the PC. The CD should automatically run the installer, but if it does not, simply run the program INSTALLER.EXE file found at the root directory of the CD. From the installer menu, you can select/highlight which of the listed programs you would like to install. To install a program, click on the desired program and then click on the run button to begin the automatic installation.

STX2 Setup Tool:

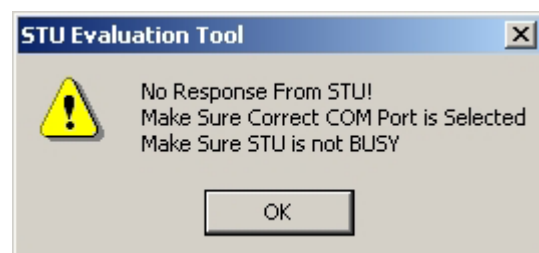
STX2 Setup Tool is a comprehensive tool set for configuring and controlling the transmitter. There are only a few options for controlling the STX2, which will be explained below.

When first starting the STX2 Evaluation Tool software the following window will appear:



The first thing that should be done is setting the COM port from the pulldown window just under the "Get STU ID window. If the wrong COM port is selected, there can be no communications between the computer and the STX2. Generally, the COM port will be the highest number available on the pulldown list, as the COM port was just installed when the software was installed and the USB cable plugged in.

If the incorrect COM port is selected and a command is set to the STX2, the following message will appear:



If this appears, just click OK and select another COM port to get communications established.

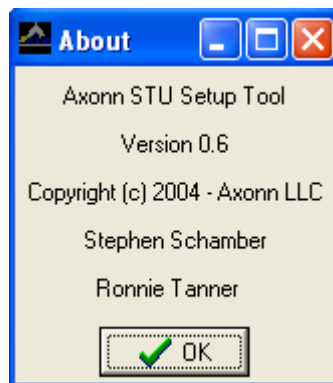
Each of the command buttons shown in this window will send a specific serial command to the STX2. All of the serial commands are documented in the STX2 Product Data Sheet with their general message format and specifics of each message. The "Get STX2 ID", "Firmware Version", "Send Data", "TX Remaining", and "Abort TX Sequence" buttons are the functional buttons on the "Send Data" page of the program. Checking the Repeat at ___ Minute Intervals box allow the user to have the STX2 transmit its data at predefined intervals. Filling in the ___ white box (default 10) with a number will direct the software to have the STX2 transit at this interval.

Setting the transmitter to transmit a generic data packet

The STX2 transmits a generic data packet by typing the data you want transmitted into the window directly below the "Send Data" button. After you have the data entered you want to transmit, pushing the "Send Data" button will serially send the data to the STX2 which will then begin its transmission sequence.

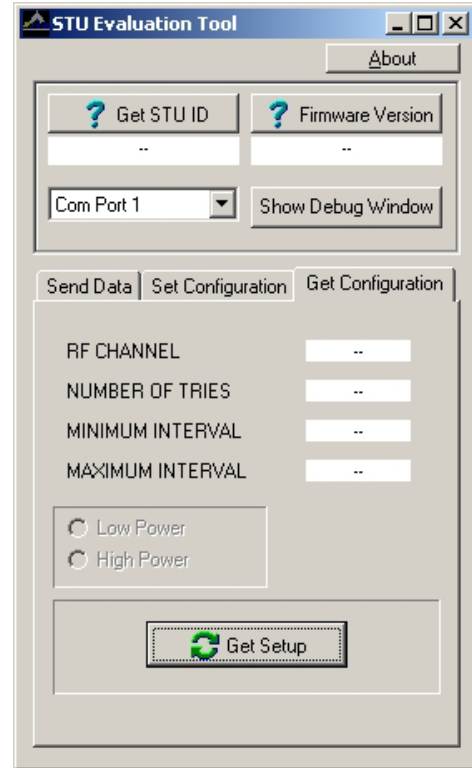
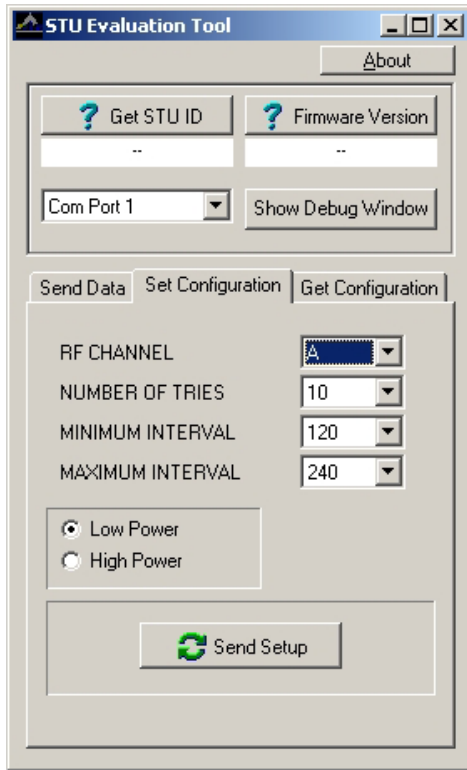
About Window:

Pressing the "About" button at the top right of the window will bring up information about the version of software running on the PC. The current released version of the STX2 Evaluation Tool is Version 0.6



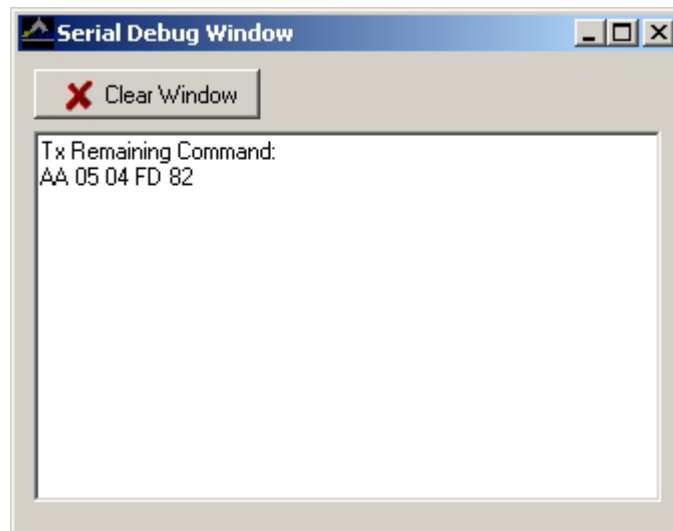
Configuration Windows:

There are two other 'pages' to the STX2 Evaluation Tool, which are the "Set Configuration" page and the "Get Configuration" page. Simply put, the "Set Configuration" page loads in the operating conditions for the STX2 to run under such as the operating frequency, retries, and dithering minimum and maximum. The "Get Configuration" page requests the current settings that are in the STX2. Both pages are shown below.



Serial Debug Window

On all pages the button "Show Debug Window" will bring up window that shows the serial information going between the application and the STX2 Development Board. Each of the hex serial commands is prefaced with text showing the type of command. The hex string following the text is the actual hexadecimal information being transferred.



Setting up a device

Upon first use, each STX2 must be set up for operation. The "Set Configuration" tab controls all setting for normal operation of the

STX2. The STX2 must be set up according the frequency and rate plans established by Globalstar in your region of the world. Please contact your local Globalstar representative for details. When the correct settings are entered for your region, pressing the "Send Setup" button will send the configuration to the STX2 and store it in non-volatile memory so that it can use this information each time it is powered up.

Status Message from a device

Once a device has been setup, pressing the "Get Setup" button on the "Get Configuration" page will update the values in all of the boxes to the right of each parameter. These boxes indicate the actual parameters that are loaded in the device.

FCC Compliance Statement:

The Satellite Transmitter 2 has been pre-approved for use in other products under the Modular rules for the Federal Communications Commission and Industry Canada. Optionally the designer may opt to test their final product to obtain their own FCC and IC ID's. All products developed by user to include the STX2 may require additional approvals by the FCC and/or IC prior to marketing or sale of such products and user bears all responsibility for obtaining prior approval.

For use in the United States, under the FCC rules, the device must have on display in plain sight:

Contains FCC ID: L2VSTX2-1

For use in Canada, under Industry Canada rules, the device must have on display in plain sight:

IC: 3989A-STX21

FCC Disclaimer:

The Development System is intended for use solely by professional engineers for evaluating the feasibility of low-power wireless data communications applications. The manufacturer recommends that the user's evaluation be within a laboratory setting.

If user has obtained the Development System for any purpose not identified above, including all conditions for assembly and use, user should return the Development System to manufacturer immediately.

AXONN L.L.C

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