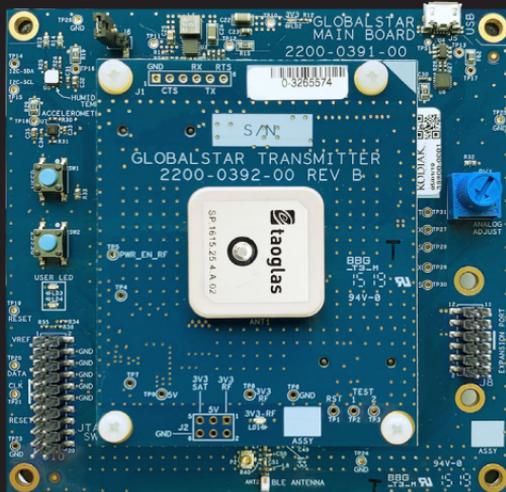


# STX3 DEVELOPMENT KIT

WITH BLE TECHNOLOGY  Bluetooth



## QUICK START GUIDE

## CONTENTS OF STX3 DEV KIT WITH BLE PACKAGE

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- STX3 Dev Kit with BLE
- This Quick Start Guide
- USB Y-Cable for programing and powering of dev kit

The STX3 Development Kit with Bluetooth Low Energy (BLE) is an easy way to send custom messages over the Globalstar Satellite Network and serves as a starting point for developers in crafting satellite transmission in their own customized products.

An accompanying mobile app (iOS or Android) allows users to issue commands to interface with the STX3 and nRF52 BLE SoC using Nordic UART Service. Through a mobile app or serial console, users may send user-defined custom data via the STX3 module through the Globalstar Satellite Network.

## KEY FEATURES

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- Globalstar Satellite Transmitter (STX3)
- nRF52832 flash-based ANT/ANT+, Bluetooth® low energy SoC solution (<https://www.nordicsemi.com/Products/Low-power-short-range-wireless/nRF52832>)
- 2.4GHz Chip Antenna for Bluetooth
- Multiple Interfacing Options: BLE, USB, STX3 UART
- User Controllable LEDs and button
- Humidity Sensor
- Temperature Sensor
- (3-axis) Accelerometer
- Analog Adjust potentiometer
- Expansion header
- Sample code and hardware schematics available upon request
- Mobile App available for iOS and Android

## ACTIVATING YOUR DEV KIT

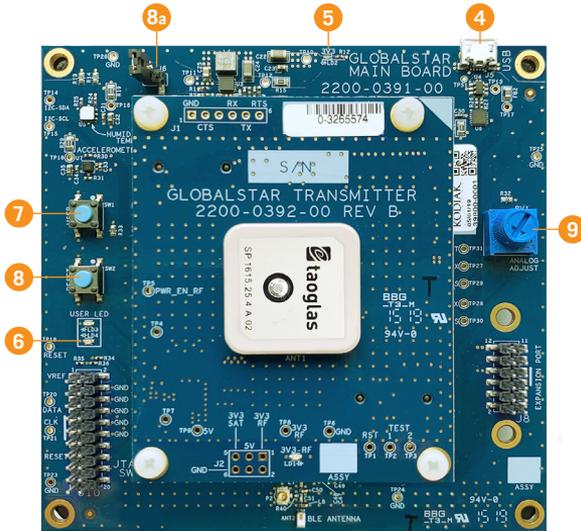
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The STX3 Development Kit comes with 60 days of pre-authorized satellite usage time. The Activation form should be submitted prior to ordering this kit, but if changes are required please contact **your authorized Globalstar dealer**.

### IMPORTANT NOTES

- The power needed for STX3 transmissions will exceed the supply current available from using only one USB port on your laptop or PC. Therefore, the USB Y-Cable is to be used to power and communicate with the STX3 Dev Kit using your laptop or PC.
- The ESN (Electronic Serial Number) of your STX3 Dev Kit is listed on the label on the top PCB along with its associated barcode.
- The user should activate the ESN associated with the Dev Kit prior to transmitting any messages. The ESN determines the routing of messaging through the Globalstar Satellite Network and the details related to the activation of the 60-day trial period. After 60 days, renewal is required with payment for continued satellite network service.
- The STX3 Dev Kit must have a clear view of the sky to communicate on the Globalstar Satellite Network.

## HARDWARE SETUP

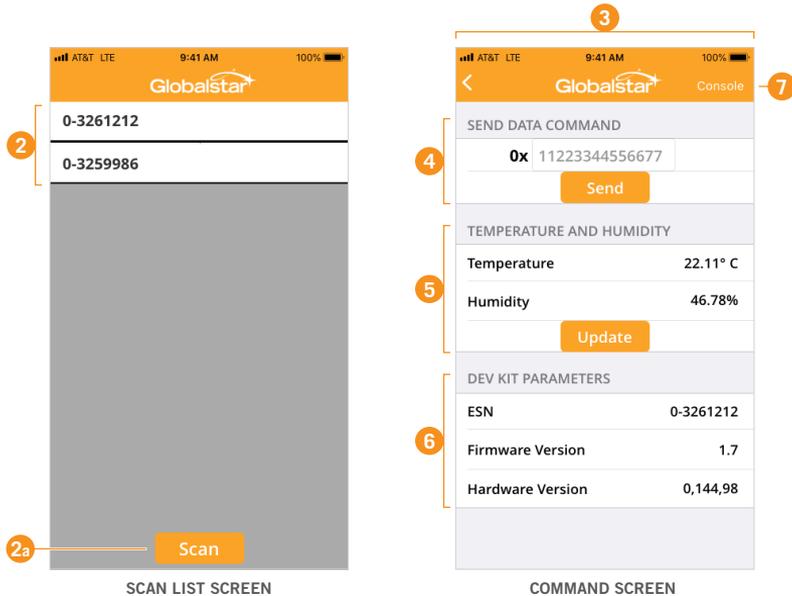


**NOTE:** Numbers to the left correlate with associated numbered step below:

1. Remove the STX3 Dev Kit from the electrostatic safe bag.
2. Connect the red USB (2) connection of the USB Y-Cable into a USB port on your PC or laptop.
3. Connect the black USB (3) connection of the USB Y-Cable into a second USB port on your PC or laptop.
4. Connect the mini-USB (4) into the Dev Kit.
  - Upon power up, the 3V3 LED (LD2) will illuminate continuously indicating power is applied.
  - Also, the USER LEDs (LD3 & LD4) will light up and blink momentarily.
5. Confirm that the 3V3 LED LD2 (5) is illuminated indicating power is applied.
6. Confirm the USER LED LD4 (6) has started to pulsate.
7. User button SW1 (7) is configured by default to send the STX3 test packet as a standard data message. Pressing it will queue the message and illuminate USER LED LD3 red until all bursts are sent.
8. Button SW2 (8) will perform a soft power reset of the nRF52 processor.
  - a. **NOTE:** If a hard power reset of the whole Dev Kit is needed, the jumper J6 can be connected to pull the input supply voltage to ground.
9. Analog Adjust Potentiometer RV1 (9) can be used to adjust the output voltage read by the on-board ADC.

## PHONE APPLICATION SETUP

1. With the STX3 Dev Kit powered, you can now launch the iOS or Android phone application to scan over Bluetooth for the ESN associated with your board. Download the STX3 Dev Kit Phone Application from either the Apple Store or Android (Google Play) Store. The name of the Globalstar STX3 Dev Kit App is **STX3-DK-BLE**.
  - **iOS** (<https://itunes.apple.com/us/app/stx3-dk-ble/id1451267236?mt=8>)
  - **Android** (<https://play.google.com/store/apps/details?id=com.globalstar.devkit>)



**NOTE:** Numbers above correlate with associated numbered step to the right:

2. Once opened, the app will automatically scan for nearby STX3 Dev Kits using BLE. Confirm that your Dev Kit's ESN is displayed in the scan list (2).  
**NOTE:** The App will stop scanning if no nearby Dev Kits are found within 30 seconds. Press "Scan" to begin scanning again (2a).
3. Select your ESN, and the App will transition to the Command screen (3).
4. Using the "Send Data Command" field, type up to 144 characters of Hexadecimal data and select "Send". Please note: Only 0-9 and A-F are valid entries into the data field (4).  
**NOTE:** 3V3-RF LED LD1 will illuminate briefly as the message is transmitted from the STX3.
  - **Please refer to Section 2 in the STX3 User Manual for more information on how messages are sent over the Globalstar Satellite Network.**
  - Confirm the data you sent was delivered to the endpoint (route) requested during activation. Note: This process may take a couple of minutes.
5. The nRF52 MCU is equipped with a temperature and humidity sensor. This can be queried with the "Update" button in the "Temperature and Humidity" Field. (5)
6. The ESN, STX3 Firmware Version and STX3 Hardware Version can be viewed in the "Dev Kit Parameters" section. (6)
7. Select **Console** (7) to be taken to the App command console for further interfacing with the Dev Kit (described in the next section).

### USING THE PHONE APPLICATION - CONSOLE

Once on the **Console** screen, you can send commands to the STX3 Dev Kit using the included Nordic BLE UART Service.

Start by typing "?" (see to the right) and sending the command by pressing the **Send** button. This will provide you with a list of commands that can be used to interface with the STX3 Dev Kit.



Please reference the table below for a description of all available commands.

- **NOTE:** The commands provided below are included only as examples and utilize the STX3 AA serial command structure for underlying communication between the nRF52 processor and the STX3. [Please refer to the Section 5.2 of the STX3 User Manual for a full description of all AA commands.](#)
- Enter the commands exactly as described in the table as the interface is case-sensitive.

COMMAND	DESCRIPTION
?	Gets this command list
esn	Queries ESN from STX3
data	Sends raw hex data over the Globalstar Satellite network
abort	Aborts all remaining bursts that are ready to be transmitted
bursts	Queries number bursts that are ready to be transmitted
hardware	Queries the Hardware version of the STX3
firmware	Queries the Firmware version of the STX3
test_cw	Enables the STX3 CW test mode transmission for 30 seconds
test_packet	Sends a single test packet over the Globalstar satellite network
test_mod	Repeatedly sends the modulated test packet for 30 seconds
setup	If sent with no arguments, queries the current transmission setup of the STX3. If sent with arguments, configures the transmission setup of the STX3
temperature	Queries the onboard temperature sensor in the nRF52 MCU
humidity	Queries the onboard humidity sensor in the nRF52 MCU
accel	Queries the x/y/z state of the accelerometer
adc	Queries the voltage reported by the ADC. Voltage can be varied by turning the Analog Adjust Potentiometer RV1

In addition to the provided commands, the application serial console can accept any valid STX3 AT Command. **For a full list of valid AT commands, please refer to Section 5.4 in the STX3 User Manual.**

#### EXAMPLE: CONFIGURING TRANSMISSION SETUP AND SENDING DATA

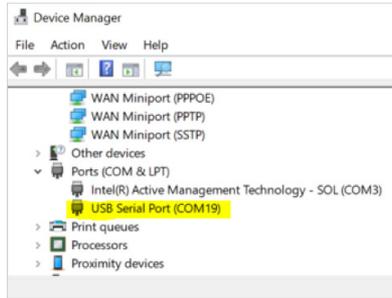
1. Sending the “setup” command without arguments queries the transmission setup and, for example, a query may return:  
`SETUP: channel=0, bursts=3, interval_min=5, interval_max=12`
  - a. Channel refers to the Transmit Channel that the STX3 broadcasts upon.
  - b. Bursts refers to the remaining transmissions for the entered message.
  - c. Interval is the duration between bursts for each message transmission.
  - d. NOTE: *interval\_min* and *interval\_max* values are set or queried in 5 second intervals. For example, *interval\_min=5* equates to a minimum transmission interval of 25 seconds.
2. It is strongly suggested to leave the transmit channel and bursts at their default value, but you may change the minimum and maximum transmit intervals, if necessary.
3. Sending the command “setup 0 3 60 100” will set the *channel=0, bursts=3, interval\_min=60, interval\_max=100*
  - a. This will result in any future transmissions on Channel 0, that have three total bursts transmitted with a minimum interval of 300s and a maximum interval of 500s.
4. Now that the transmission setup is configured, a message can be sent. To send “HelloWorld” in Hex with the “data” command, type `data 48454C4C4F574F524C44`
5. Check that the information was sent to the endpoint configured when the unit was provisioned. The data will be sent in two 9-byte packets and should look like “0x48454C4C4F574F524C440000000000000000”

## USING THE USB SERIAL CONSOLE

To use the USB Serial Console, an application capable of TTY communication over USB should be downloaded. The examples in this guide will reference PuTTY on Windows 10, which can be downloaded via this link: <https://www.putty.org>

After powering up your STX3 Dev Kit with BLE and connecting the Black USB Y-Cable to your PC, you are ready to use the Serial USB Console.

1. Validate that the STX3 Dev Kit is recognized as a serial COM port by the Windows PC by opening the Windows Device Manager utility and observing the listing under the Ports (COM & LPT) devices. The STX3 Dev Kit will show up as “USB Serial Port (COMxx)” where xx is the communications port number. As highlighted in the example below, the STX3 Dev Kit is on communications port COM19.



2. Open PuTTY and select “Serial” connection type. Enter the COMxx port for the STX3 Dev Kit as the Serial line and configure the Speed (Baud) to 115200. Select “Open” and a console window will open to the STX3 Dev Kit.
3. At this point, the console can be used in the same manner as the “Using the Phone Application Console” section indicates above. Type “?” to show the list of commands.

## INTERFACING DIRECTLY WITH THE STX3

If desired, the STX3 daughter board can be removed from the STX3 Dev Kit for direct interfacing with the STX3. In order to do this, the user must follow the power supply guidelines in Section 4.3 of the STX3 User Manual. Additionally, to send commands to the STX3 directly, the user must implement the necessary serial interface as described in Section 5.1 of the STX3 User Manual.

For more detailed information on this advanced usage of the STX3 Dev Kit with BLE, please refer to the STX3 Dev Kit with BLE User Manual.

## ADVANCED DEVELOPMENT AND CUSTOMIZATION

With the STX3 Development Kit connected and communicating, you can now begin development and integration with your own design. This kit provides you with various examples for interfacing applications and peripheral sensors with the STX3. This Development kit also has an expansion port for you to connect to other development boards and utilize your existing design.

For further explanation of how to get started with software design and integration of the STX3 with your design, please refer to the STX3 Dev Kit with BLE User Manual and the STX3 Dev Kit with BLE Software Design guide.

Globalstar can provide Gerber files, hardware schematics and source code for all apps and nRF52 firmware upon request.

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