XBee Studio

User Guide

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Revision history–90002519

Revision	Date	Description
A	August 2022	Initial release of the *XBee Studio User Guide*.
B	March 2023	Updates to UI and minor fixes.

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- Product name and model
- Product serial number (s)
- Firmware version
- Operating system/browser (if applicable)
- Logs (from time of reported issue)
- Trace (if possible)
- Description of issue
- Steps to reproduce

Contact Digi technical support: Digi offers multiple technical support plans and service packages. Contact us at +1 952.912.3444 or visit us at www.digi.com/support.

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Include the document title and part number (XBee Studio User Guide, 90002519 B) in the subject line of your email.

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XBee Studio User Guide

XBee Studio is a free multi-platform application that enables developers to manage Digi XBee devices through a simple-to-use graphical interface. The application includes embedded tools that make it easy to set up, configure, communicate with, and test Digi XBee devices.

Use XBee Studio to:

- **Deploy on multiple platforms**: XBee Studio is compatible with the most popular operating systems, including Microsoft Windows, macOS and Linux.
- **Discover your devices**: Automatically discover local XBee devices connected to your computer, regardless of their port connections or configured settings, and remote XBee devices joined to the network of your local device.
- **Configure any device**: Manage and configure multiple XBee devices, including devices of your Digi Remote Manager account located all over the world.
- **Communicate with your devices**: Use the new smart XBee console to communicate with your devices, regardless of whether they are in API or AT operating mode.
- **Explore your network**: Visualize the topology of your RF networks, displaying all network nodes and connections graphically or in a table, as well as configure and update any remote nodes of the network.
- **Access a range of tools**: Use embedded tools to perform operations like creating XBee profiles or recovering your devices.
- **Get automatic updates**: Automatically update the application itself, as well as the radio firmware library, without downloading any extra files.

Get started by downloading and installing XBee Studio, or use this documentation to learn how to use the tool.

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Download and install XBee Studio

This section contains download and install instructions based on operating system. XBee Studio is compatible with Windows, macOS and Linux. It may be necessary to configure your system prior to installing XBee Studio for the first time.

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Requirements

System requirements

XBee Studio is a cross-platform application compatible with Windows, macOS, and Linux operating systems.

Requirement	Minimum	Recommended
Operating system	▪ Microsoft Windows 7 or later (64-bit version) ▪ Any Linux distribution that supports Gnome or KDE (64-bit version) ▪ macOS 10.14 or later (64-bit Intel processors only)	Latest 64-bit version of Windows, macOS, or Linux.
RAM	4 GB of free RAM	8 GB of total system RAM
CPU	Any modern CPU	Multi core CPU
Disk space	1 GB	SSD drive with at least 2 GB
Monitor resolution	1024x768	1920x1080

Supported Digi devices

XBee Studio supports configuration and communication for the following Digi devices:

- Digi XBee 3 Cellular LTE CAT 1 AT&T
- Digi XBee 3 Cellular LTE CAT 1 Verizon
- Digi XBee 3 Cellular LTE-M/NB-IoT
- Digi XBee 3 Global LTE Cat 1
- Digi XBee 3 North America LTE Cat 1
- Digi XBee 3 Global LTE-M/NB-IoT
- Digi XBee 3 Global LTE-M/NB-IoT Low Power
- Digi XBee 3 Global LTE Cat 4
- Digi XBee 3 North America LTE Cat 4
- Digi XBee 3 Zigbee 3
- Digi XBee 3 DigiMesh 2.4
- Digi XBee 3 802.15.4
- Digi XBee RR Zigbee 3
- Digi XBee RR DigiMesh 2.4
- Digi XBee RR 802.15.4
- Digi XBee BLU

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Windows installation

Follow the steps below to download and install XBee Studio on your computer.

1. Visit https://www.digi.com/xbeestudio.
2. Click **Download XBee Studio**.
3. Under **Utilities**, click the Windows installer link.
4. When the file has finished downloading, run the installer file and follow the steps in the XBee Studio Setup Wizard.

A Welcome page appears when XBee Studio opens the first time after the installation.

XBee Studio updates

You may be notified about XBee Studio software updates once the application has loaded. You should always update XBee Studio to the latest available version.

macOS installation

Follow the steps below to download and install XBee Studio on your computer.

1. Visit https://www.digi.com/xbeestudio.
2. Click **Download XBee Studio**.
3. Under **Utilities**, click the macOS installer link.
4. When the file has finished downloading, double click on it. The XBee Studio installer is uncompressed.
5. Run the installer file and follow the steps in the XBee Studio Setup Wizard.

A Welcome page appears when XBee Studio opens the first time after the installation.

XBee Studio updates

You may be notified about XBee Studio software updates once the application has loaded. You should always update XBee Studio to the latest available version.

Linux installation

By default, access to the serial and USB ports in Linux is restricted to **root** and **dialout** group users. To access your XBee devices and use XBee Studio to communicate with them, your Linux user must belong to one of these groups.

To add your Linux user to the **dialout** group:

1. Open a terminal console.
2. Execute this command:

```
sudo usermod -a -G dialout <user>
```

   where **<user>** is the user you want to add to the **dialout** group.

3. Log out and log in again with your user in the system.

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Then download and install XBee Studio:

1. Visit https://www.digi.com/xbeestudio.
2. Click **Download XBee Studio**.
3. Under **Utilities**, click the Linux installer link.
4. When the file has finished downloading, add execution permissions to it: right click > **Properties** > **Permissions** > **Allow executing file as program**.
5. Run the installer file and follow the steps in the XBee Studio Setup Wizard.

A Welcome page appears when XBee Studio opens the first time after the installation.

XBee Studio updates

You may be notified about XBee Studio software updates once the application has loaded. You should always update XBee Studio to the latest available version.

Install Digi USB RF drivers

When you connect an XBee board to your computer for the first time, USB drivers are installed automatically. There are times when this does not occur, and you need to install device drivers manually:

1. Find the appropriate drivers on the Digi support site.
2. Choose your operating system.
3. Download and run the file.
4. Follow the steps in the installation wizard.

Install USB drivers for cellular modems

XBee Studio requires additional drivers to update the modems of XBee 3 Cellular devices. If you have not installed them, use the following instructions to do so depending on the devices you want to program.

Note This step is only required if you are programing the modem of XBee 3 Cellular LTE CAT 1, XBee 3 Cellular LTE-M/NB-IoT, or XBee 3 Global LTE Cat 1 devices. Note that this is only available for Windows.

Drivers for XBee 3 Cellular LTE CAT 1

1. Go to the Telit drivers page.
2. Select the **Telit Windows Desktop Drivers Installer**.
3. Run the executable file.
4. Follow the steps in the installation wizard.

Drivers for XBee 3 Cellular LTE-M/NB-IoT

1. Download the u-blox drivers.
2. Uncompress the file and run the executable.

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3. Follow the steps in the installation wizard.
4. After driver installation completes, reboot your computer.

Drivers for XBee 3 Global LTE Cat 1

1. Download the Thales drivers.
2. Uncompress the file and run the executable.
3. Follow the steps in the installation wizard.
4. After driver installation completes, reboot your computer.

CAUTION! If you are using Windows 7, we highly recommend that you disable the drivers installation from Windows Update in order to speed up the modem update process. For more information on how to do this, see How to stop Windows 7 automatically installing drivers.

XBee concepts and terminology

This section contains concepts regarding Digi XBee modules and the XBee Studio application itself. Understanding these concepts will help you work most effectively with XBee Studio.

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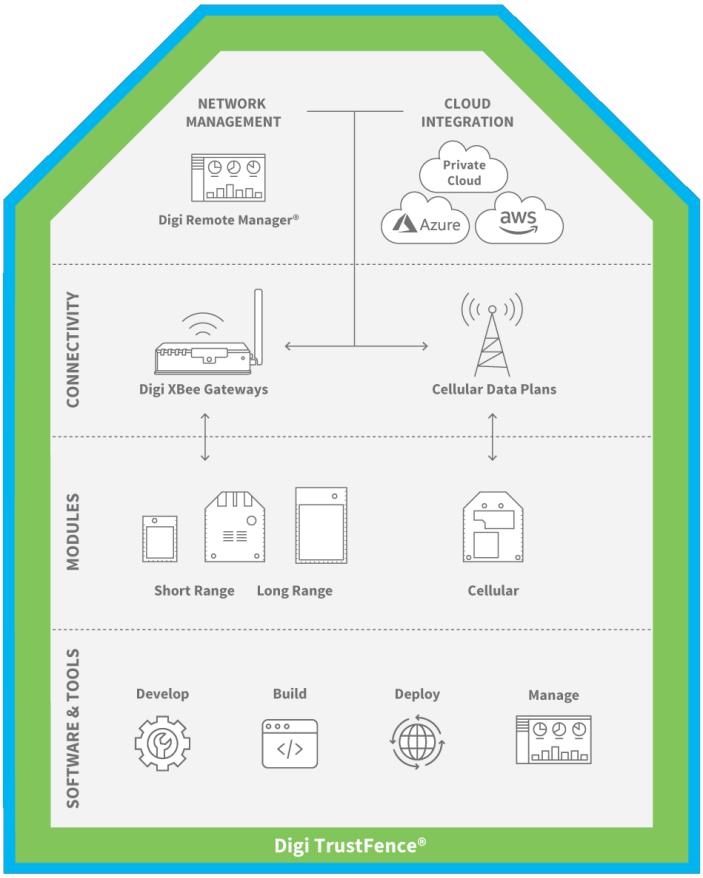
XBee ecosystem

The world-renowned XBee module is part of a family of cellular modems and RF modules that provide ultimate flexibility for IoT application developers, with three programmable form factors, and a range of popular wireless protocols. The XBee family also includes IoT gateways and management tools to connect, monitor and manage your XBee network.



XBee RF modules

Digi XBee RF modules provide wireless connectivity in a range of protocols and form factors to support today's low-power applications. Easy-to-deploy, pre-certified, and configurable using Digi XBee Studio, Digi XCTU, the Digi XBee Mobile App and Digi Remote Manager® (Digi RM), these low-cost modules support all of your wireless design requirements.

Note For further information about XBee RF modules, see Digi XBee RF Modules.

XBee Cellular modems

Digi XBee offers the easiest way to integrate cellular connectivity into an OEM device. With the introduction of 3GPP standards like LTE Cat 1, LTE-M and NB-IoT, as well as older standards like

3G HSPA/GSM, Digi has the cellular modem for your design. Digi XBee Cellular modems provide easy cellular connectivity without having to go through a costly FCC or carrier end-device certification process.

Note For further information about XBee Cellular modems, see Digi XBee Cellular Modems.

XBee Gateways

A cellular gateway in an IoT system converts wireless protocols like Zigbee, DigiMesh, or LoRaWAN to cellular. The gateway acts as a bridge between an enterprise LAN and the Internet, and can connect a variety of network protocols to IP or cellular networks. Gateways also support edge compute by aggregating data, converting it from analog to digital, and encrypting it before transmitting it over the network.

Note For further information about XBee Gateways, see Digi XBee Gateways.

XBee firmware and profiles

Radio firmware is program code stored in an XBee device's persistent memory that provides the control program for the device. Digi periodically releases new radio firmware versions to improve functionality or fix bugs, which are automatically downloaded by XBee Studio.

Note You should always run the latest firmware on your XBee devices. To know how to update the firmware, see Firmware update.

XBee profiles

An XBee profile is a snapshot of a specific radio firmware configuration, including firmware, setting values, file system and other configuration information. Profiles can be used later in XBee Studio or other Digi RF applications.

XBee Studio allows you to create, inspect and apply configuration profiles to XBee devices. This feature is useful in a production environment when you need to set the same parameters on multiple devices.

Radio communication protocols

A radio communication protocol is a set of rules for data exchange between two or more XBee RF devices or between an XBee Cellular modem and a Cellular network. Each XBee device supports a specific radio communication protocol or several depending on the module type and its radio firmware.

The following is the list of most important protocols supported by the XBee devices:

- IEEE 802.15.4
- Zigbee
- DigiMesh (Digi proprietary)
- Point-to-multipoint (Digi proprietary)
- IEEE 802.11 (WiFi)

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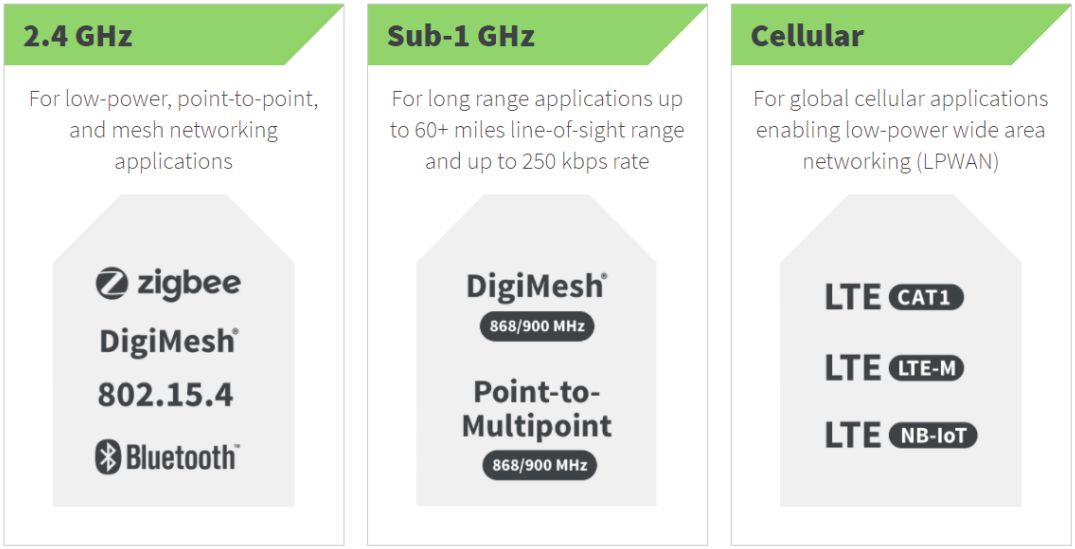
- Cellular
- Bluetooth Low Energy



Not all XBee devices can run all listed communication protocols. The combination of XBee hardware and radio firmware determines the protocol that an XBee device can execute. For more information about the available XBee devices and the protocols they support, see the Digi XBee Family Features Comparison document.

Device operating modes

The operating mode of an XBee device establishes the way a user or any microcontroller attached to the XBee communicates with the module through the Universal Asynchronous Receiver/Transmitter (UART) or serial interface.

Depending on the firmware and its configuration, XBee devices can work in different operating modes:

- Application Transparent (AT) operating mode.
- API operating mode.
- API escaped operating mode.
- MicroPython mode.

In general, the operating mode is determined by the **AP** setting, which allows you to configure the mode to be AT (**AP** = 0), API (**AP** = 1), API escaped (**AP** = 2) or MicroPython (**AP** = 4).

AT operating mode

In AT (Application Transparent) or transparent operating mode, all serial data received by the device is queued up for RF transmission. When RF data is received by the device, the data is sent out through the serial interface.

To configure an XBee device operating in AT, you must put it in command mode to send the configuration commands.

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AT Command mode

When the device is working in AT operating mode, you must use the command mode interface to configure settings.

To enter AT command mode, send the three-character command sequence (usually **+++**) within one second. Once AT command mode has been instigated, the module sends an **OK\r**, the command mode timer is started, and the device is able to receive AT commands.

AT command structure

The structure of an AT command is:

```
AT[ASCII command][Space (optional)][Parameter (optional)][Carriage return]
```

For example:

```
ATNI MyDevice\r
```

If no valid AT commands are received within the command mode timeout, the radio module automatically exits AT command mode. You can also exit command mode by issuing the CN command:

```
ATCN\r
```

API operating mode

API (Application Programming Interface) operating mode is an alternative to AT mode. API operating mode requires that communication with the device be done through a structured interface. In other words, data is communicated via API frames.

The API specifies how commands, command responses, and module status messages are sent and received from the device using the serial interface. With API operating mode, you can:

- Configure the XBee device itself.
- Configure remote devices in the network.
- Manage data transmission to multiple destinations.
- Receive success/failure status of each transmitted RF packet.
- Identify the source address of each received packet.

Depending on the AP parameter value, the radio module can operate in one of two modes: API (**AP** = 1) or API escaped (**AP** = 2) operating mode.

API escaped operating mode

API escaped operating mode (**AP** = 2) is similar to API mode except that when working in API escaped mode, some bytes of the API frame specific data must be escaped. Since XBee Studio is compatible with both API and API escaped operating modes, you do not need to manually escape characters.

API escaped operating mode increases the reliability of RF transmission by preventing conflicts with special characters such as the start-of-frame byte (0x7E). API non-escaped (API=1) operation relies solely on the start delimiter and length bytes to differentiate API frames. In API escaped mode, on the other hand, those special bytes are escaped. Since 0x7E can only appear at the start of an API packet, a module can always "assume" that a new packet has started if 0x7E is received at any time while in API escaped mode.

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Escape characters

When sending or receiving an API frame in API escaped mode, specific data values must be escaped (flagged) so they do not interfere with the data frame sequence.

To escape a data byte, insert 0x7D and follow it with the byte to be escaped XOR'd with 0x20. The data bytes that need to be escaped are as follows:

- 0x7E: Frame delimiter
- 0x7D: Escape
- 0x11: XON
- 0x13: XOFF

Note XBee Studio automatically escapes the appropriate characters when interacting with devices configured in API escaped mode.

MicroPython mode

MicroPython mode allows you to communicate with an XBee 3 device using the MicroPython programming language. This mode connects the primary serial port to the stdin/stdout interface on MicroPython, which is either the REPL or code launched at startup.

Note For more information about MicroPython, read the **Get started with MicroPython** section of the XBee device product manual.

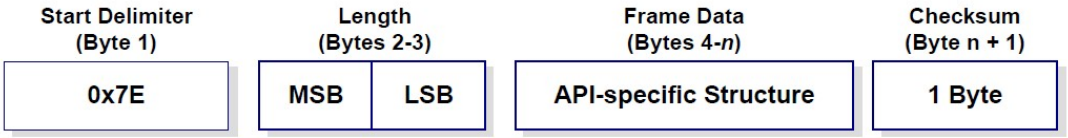
You can use the MicroPython Terminal to communicate with the MicroPython stack of any XBee 3 device configured in MicroPython mode.

To configure an XBee device operating in MicroPython mode, you must put it in command mode to send the configuration commands as when it operates in AT operating mode.

API frames

An API frame is the structured data sent and received through the serial interface of the XBee device when it is configured in API or API escaped operating modes. API frames are used to communicate with devices connected to your computer or other devices in the network.

An API frame has the following structure:



Field	Description
Start delimiter	The first byte of a frame consisting of a special sequence of bits which indicate the beginning of a data frame. Its value is always 0x7E. This allows for easy detection of a new incoming frame.
Length	Specifies the total number of bytes included in the frame data field. Its two-byte

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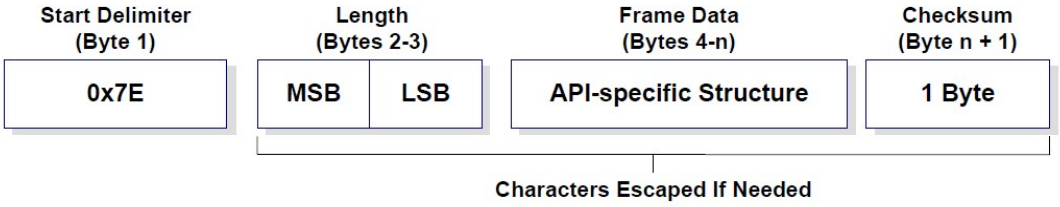
Field	Description
	value excludes the start delimiter, the length, and the checksum.
Frame data	Composed by the API identifier and the API identifier-specific data. The content of the specific data depends on the API identifier (also called API frame type).
Checksum	The last byte of the frame. It helps test data integrity and is calculated by taking the hash sum of all the API frame bytes that came before it, excluding the first three bytes (start delimiter and length).

If your device is operating in API escaped operating mode, some bytes in the Length, Frame data, and Checksum frame fields may need to be escaped. XBee Studio automatically performs this step and escapes the appropriate characters. See API escaped operating mode for more information about API escaped operating mode.



Note There are many different types of API frames. You can use the API frames tool to learn the specific data contained within a determined API frame as well as to build and fill any type of API frame.

AT settings or commands

The firmware running in XBee devices contains a set of settings and commands that can be configured to change the behavior of the module or to perform any action related to it. Depending on the protocol and firmware version, the number of settings and their meanings varies, but all XBee devices can be configured with AT commands.

All firmware settings or commands are identified with two ASCII characters. Applications and documents refer to them as either AT settings or AT commands.

The configuration process of these AT settings varies depending on the operating mode of the device.

Configuring in AT mode

In AT operating mode, you must put the device in a special mode called command mode so it can receive AT commands. For more information about configuring devices working in AT operating mode, see AT operating mode

Configuring in API mode

To configure or execute AT commands when the device is in API operating mode, you must generate an AT command API frame containing the AT setting identifier and the value of that setting, and send it to the device. You can do this with the API Frames tool.

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Local and remote devices

A **local device** is any XBee physically attached to your computer through a USB or serial port. A local device can discover remote devices in the same network if their protocol is Zigbee, DigiMesh or 802.15.4.

A **remote device** is any XBee RF module not physically attached to your computer which is in the same network as a local device. Communication between XBee Studio and a remote device takes place in two stages: serial communication from XBee Studio to the local device, and wireless communication between the local device and the remote device. XBee Studio uses the serial port to send a message intended for the remote device, along with delivery specifics, to the local device. The local device then transmits the message wirelessly to the remote device.

If the local device is configured in AT (Transparent) operating mode, you cannot configure its remote devices due to a protocol limitation, only if it is configured in API operating mode.

Note Since remote devices are not physically connected to the computer, they do not have access to all functionality as local devices do.

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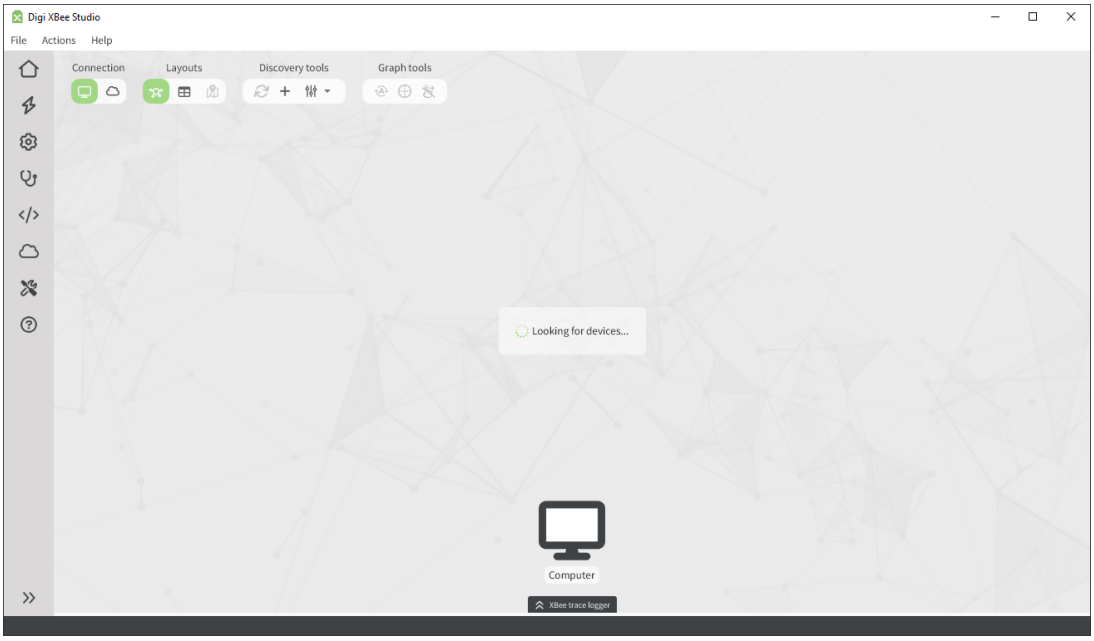
XBee Studio overview

XBee Studio is divided into three main sections: the sidebar, device browser and workspace.



Sidebar

The sidebar is located on the left side of the application and has direct accesses to the device browser (home) and the main functionality of XBee Studio. Each category opens a step-by-step wizard with the different operations you can do with your devices or other tools available in the application.

For further information about the different categories, see Explore other functionality.

Device browser

The device browser is the largest area and is located on the center of the application. XBee Studio automatically looks for XBee devices connected to your computer or to your Digi Remote Manager account(s) and shows them here with information about their address and connection type.

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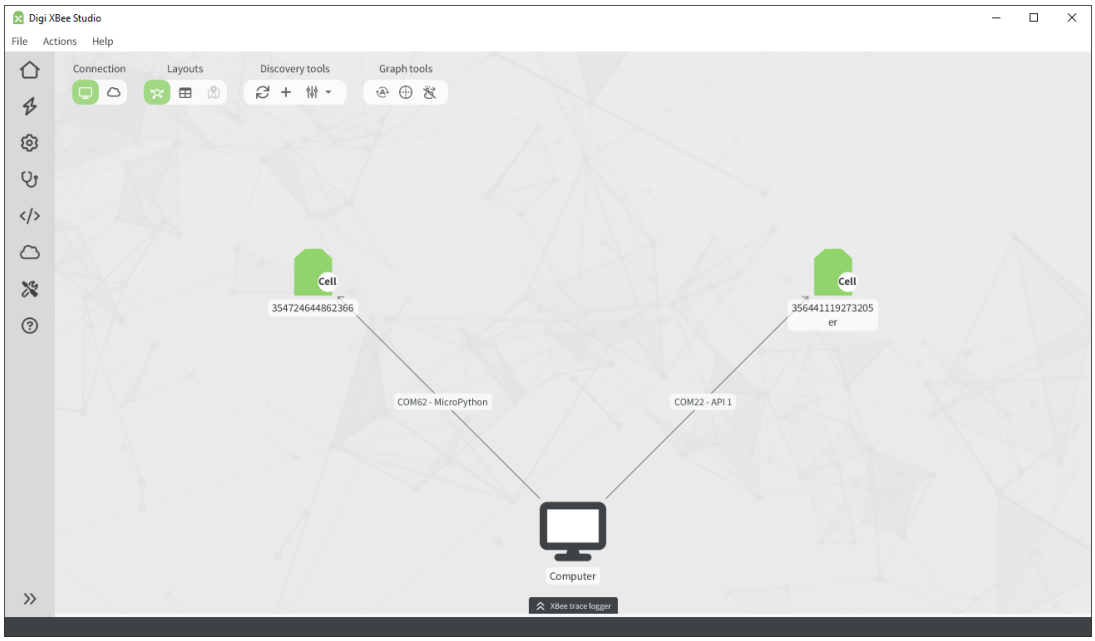
XBee Studio overview *Device browser*



You can switch the view to cloud-based devices by clicking the cloud button of connection switch of the top section.

Note In order to view and work with cloud-based devices, you need to add your Digi Remote Manager account(s) first. See Remote Manager to know how to do this.

Graphical view

By default, XBee Studio shows the devices as nodes around the root node (computer or cloud, depending on where the devices are discovered from). Every device shows its name, unique address (IMEI in XBee 3 Cellular or 64-bit address in XBee 3 RF), and protocol in the node, and serial port information or cloud account in the connection line.

When hovering over a device, XBee Studio shows some buttons with the most common actions you can do with it. You can also click the device itself to go to the device Dashboard.

In the top right box you can control how the devices are represented in the view:

- Enable/disable auto layout. When you enable this option, devices are automatically arranged in real time dynamically.
- Switch to circular/arc layout. When you switch to circular layout, devices are arranged in a circular way around the root node instead of in an arc.
- Disable/enable manual positioning. When you disable this option, devices stop being draggable, so you cannot move them manually.

Table view

XBee Studio can also display the available devices in table format instead of graphically, which can be useful if you have many devices or you want to display them in a more organized way. To switch to this view, click the table button of the layout switch of the top section.

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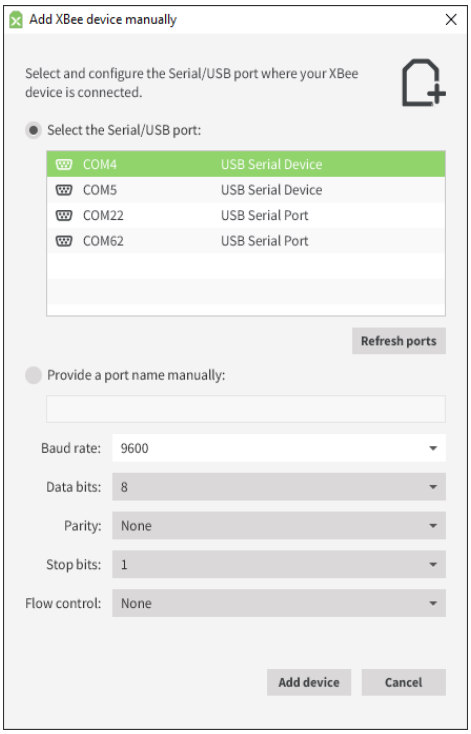
As in the graphical view, the table view shows basic information about each device and allows you interact with their most common functionality.

When more than 10 devices are discovered, XBee Studio switches to table format automatically. The graphical view will be blocked until the number of discovered devices decreases below 10.

Device discovery tools

The top left box has the following buttons:

- Refresh button to launch a discovery process at any time. This option will launch an individual discovery process at a time. This action is identified by the refresh button spinning during the whole process. Once the action finishes, the button stops spinning, as well.
- Add device manually button to trigger a manual discovery on the desired device. You will need to either select the serial port or type its name and then, input the rest of the serial port configurations and click the Add device button. Once discovered, the device will be added to the device browser area. Use this feature when you know the serial port configuration of a device and it does not match the default serial port configuration of XBee Studio—baud rate 9600, 38400 or 115200, data bits 8, parity none, stop bits 1. This is only available for local discovery processes.



- Discovery settings button. When clicked, this button shows a dropdown menu with the following four options:
  - **Enable auto-discovery item**. Enabled by default. It allows you to enable/disable the auto discovery feature of XBee Studio. This feature consists of starting a new discovery

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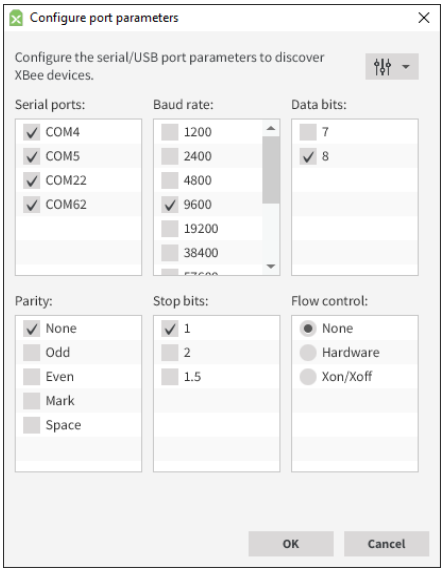
process whenever a new device is plugged/unplugged from the PC or added/removed from your Digi Remote Manager account.

- **Stop discovery**. Stops the current discovery process.
- **Advanced discovery options item**. Opens a dialog to configure the options of a discovery process. For local devices, you can exclude any serial/USB ports and select the port parameters to discover XBee devices. For cloud devices, you can decide to search for devices in all Digi Remote Manager groups or select specific ones.



- **Clear devices**. Clears the list of discovered devices. If XBee Studio is using any of them when clicking this item, a dialog asks you to confirm the closing operation when possible.

Workspace

The workspace is the main area of the application, it is organized in tabs and is layered on top of the device browser. Each tab represents either a device or an XBee Studio tool, so you can change between any open tab at any time. This means that when a device is in the middle of a long process, you can still work with other devices or tools in the meantime.

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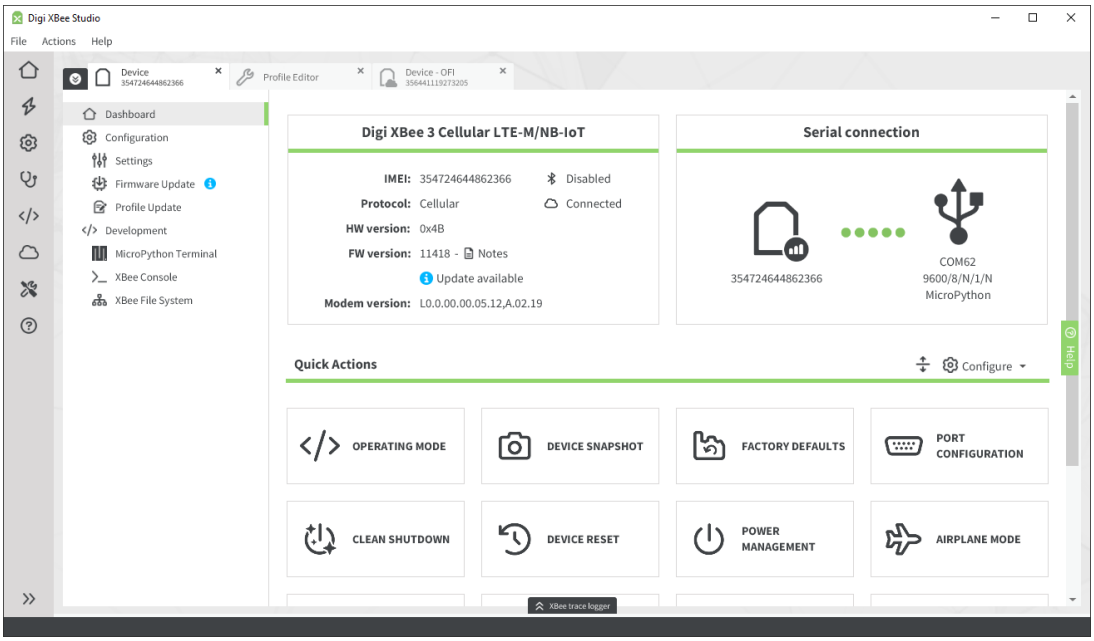

Tabs can be detached from the main window with a drag-and-drop gesture or right clicking it and selecting **Detach**, which can be useful if you want to have two or more tabs always visible at the same time.

The workspace can be collapsed by clicking the **Home** button of the sidebar or the black **Expand/Collapse** button, the farthest to the left on the tab header.

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Quick setup

XBee Studio introduces a new tool to deploy pre-defined setups into one or several XBee devices in a quick and easy way. These setups can go from getting started processes or simple configurations that demonstrate different features of XBee devices, to more elaborated demos that include MicroPython applications and other components to form a complete system.

Choose the setup

The first thing you need to do is to choose the setup you want to apply:

- Click the desired setup from the list. You can review the requirements and description of the setup in the right panel.
- Click **Start**. A new tab opens for the selected setup.

Select the devices

In the next step of the quick setup process, you have to select the devices you want to configure and decide which role applies to each one. Depending on the setup you have chosen, there could be just one role or more. Each role box on the main pane contains information on the number of devices required.

1. Drag each device that you want to configure from the left list and drop it into a role box.
2. Click **Next**.

Note The device list on the left side only shows those devices that are compatible with the selected setup. If you don't see any, this means that none of your local devices is compatible with the setup.

Configure specific parameters

Depending on the selected setup, you might need to fill in some required and/or optional configurations. The required ones are marked with an asterisk.

1. Fill in the required and/or optional configurations.
2. Click **Next**.

Review the setup

The last step before configuring your devices is to review the setup. This includes both, the devices you have previously assigned to each role, and the configurations you have filled in. When you are ready and have verified everything is correct, click **Start**.

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Set up your devices

In this step, your devices will be configured according to the role you have assigned to each one and the selected configurations. You can see the progress of the process in the table.

Test the setup

When the process finishes and all your devices are set up, you will see some instructions on how to test the setup. If you want to set up more devices, click **Add more devices**.

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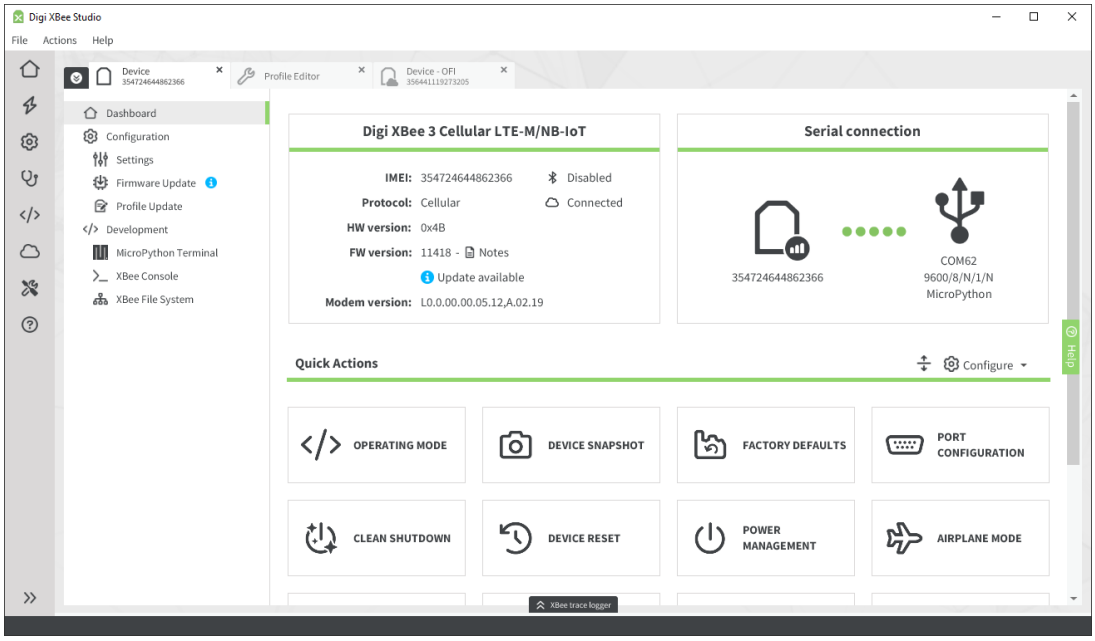
Work with your devices

This section describes how you can configure and communicate with an XBee device in the workspace once you have selected it from the device browser.



The device tab shows a left menu with the different sections available for that device:

Dashboard 29
Configuration 32
Diagnostics 36
Development 43
Network 52

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Note Not all devices support all the sections listed above.

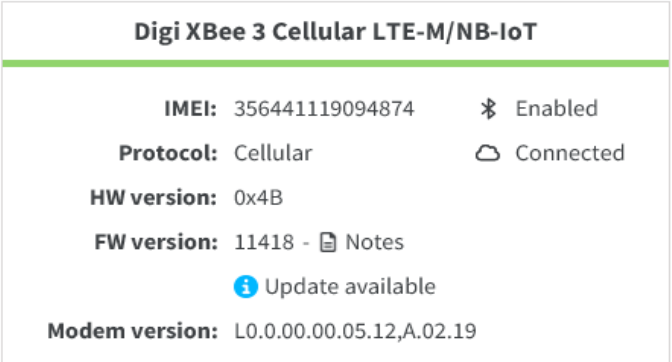
Dashboard

This is the initial page of a device. It contains status cards with information about the device and also some quick action cards to speed up some configurations.

This page is divided into three sections:

Product

Contains the general information of the device. It is structured into two columns:



- **Information column (left)**: The basic information of the device:
  - Device address: IMEI for cellular devices and 64-bit address for the rest of XBee device types.
  - Name: The node identifier of the device when the connection is done serially, or the device name when the connection is done through the cloud.
  - Protocol: The XBee protocol running on the device.
  - HW version: The hardware version of the device. Matches the **HV** AT command of the device.
  - FW version: The firmware version of the device. Matches the **VR** AT command of the device. It also shows a graphic indicator to let you know if the device is up-to-date or there is an update available and it contains a link to display the release notes of the firmware running in the device.
  - Modem version: The firmware version of the modem. Matches the **MV** AT command of the device. Only applicable to cellular devices.
- **Status column (right)**: The statuses of some features of the device:
  - BLE connection status: Whether the device has its BLE feature enabled or not. This is only shown when the device has support for this functionality.
  - Cloud connection status: Whether the device is connected to Digi Remote Manager or not.

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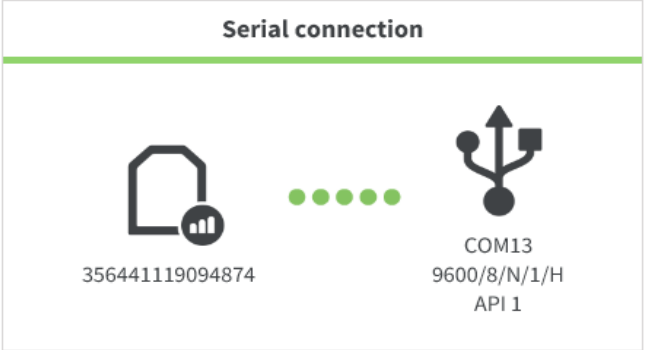
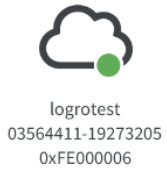
Connection

Contains the information about the connection with the device. It has two sections:



- The device section (left) contains an icon of the device type with the protocol it runs and below, the basic information of the device: name and device address–IMEI for cellular devices and 64-bit address for the rest of XBee device types.
- The connection section (right) shows an icon indicating the connection type and some extra information about the connection. So far, two connection types are supported:
  - **Serial**: Device is directly connected to your PC using a serial or USB cable, depending on the adapter board of the device. Under the icon, the serial port information is displayed–serial port name, baud rate, data bits, parity, stop bits and hardware flow control. For XBee devices, their operating mode is also displayed here.

  - **Cloud**: Device is connected through internet using your Digi Remote Manager account. This means the device must be added to the selected Digi Remote Manager account to be able to access it with XBee Studio. In this case, the cloud icon that represents the connection type has an online status indicator that is set to green when the device is connected to Digi Remote Manager and red when it is offline. Under that icon, the information that Digi Remote Manager provides for this device is shown, like account username, device ID and vendor ID.



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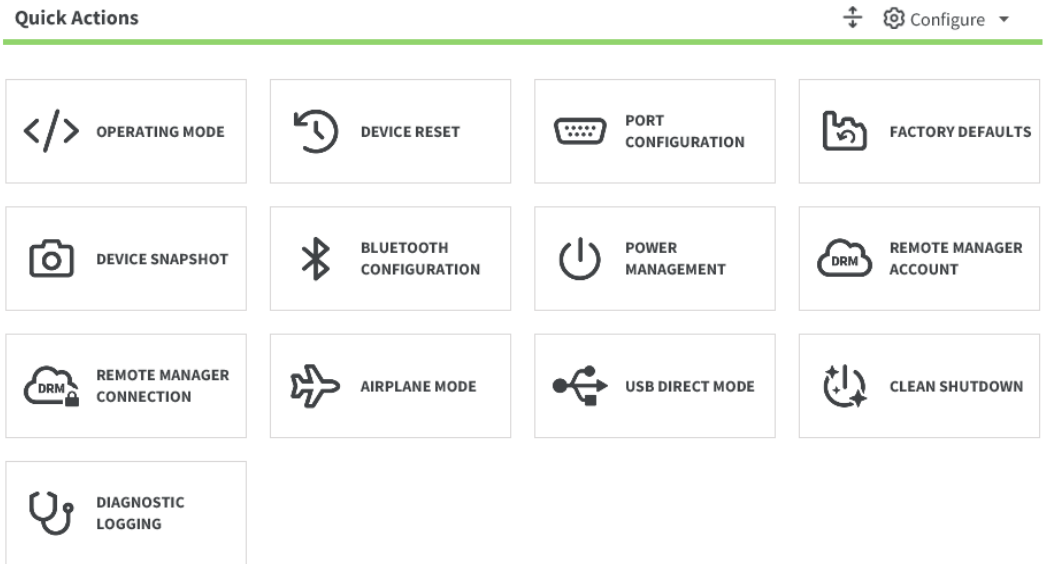
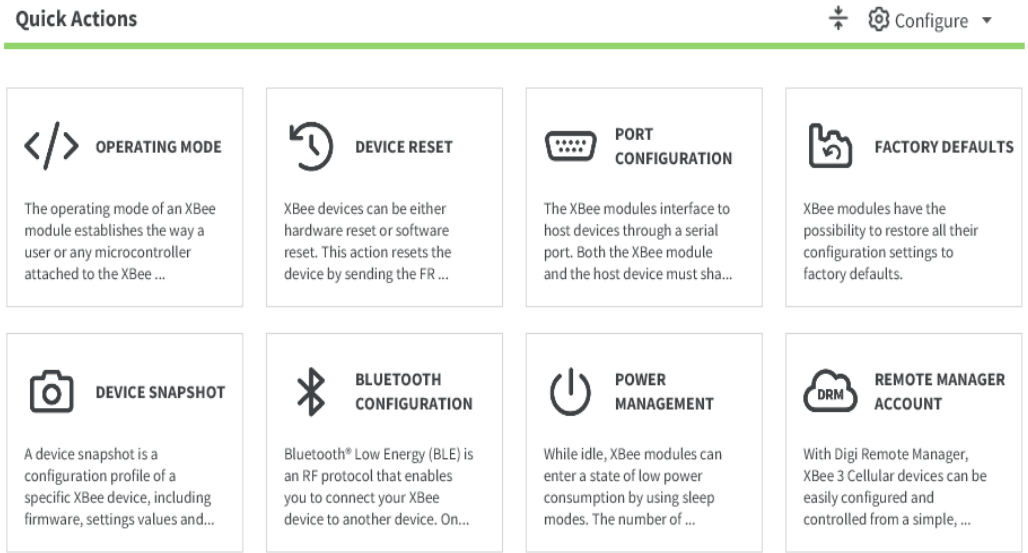
Quick Actions

This section uses up the remaining space of the page and it contains as many cards as quick actions the device supports amongst the list of all available quick actions. Each card contains an icon and the title of the action when actions are in their collapsed (default) state. When they are in their expanded state, each card contains an icon, the title and the description of the action. When a quick action is clicked, a popup opens up with the specific content of the action and buttons to execute the action or cancel it.

Quick Actions:



More Quick Actions:



The full list of quick actions is:

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- **Device Name**: Updates the name/node identifier of the device.
- **Operating mode**: Updates the operating mode of the device.
- **Device reset**: Performs a software reset of the device.
- **Port configuration**: Updates the port configuration of the device.
- **Factory defaults**: Restores the device configurations to their default values.
- **Device snapshot**: Creates a configuration profile based on the device settings and file system.
- **Bluetooth configuration**: Manages the Bluetooth low energy (BLE) configuration of the device.
- **Power management**: Handles the sleep modes and power level of the device to extend it's battery life.
- **Remote manager account**: Adds the XBee 3 Cellular device to Digi Remote Manager.
- **Remote manager connection**: Configures the connection parameters of the XBee 3 Cellular device with Digi Remote Manager.
- **Airplane mode**: Enables or disables the cellular component of the XBee 3 Cellular device.
- **USB Direct mode**: Enables the USB direct mode to allow access to the modem's USB interface through pins 7 and 8 of the XBee.
- **Clean shutdown:** Unregisters the XBee 3 Cellular device from the cellular network and safely stores operating parameters.
- **Diagnostic logging**: Enables the diagnostic logging feature to start capturing information of the device and record it in a file of your choice.
- **Network**: Configures the network and encryption parameters of the XBee 3 RF device.
- **Role**: Configures the role of the XBee 3 Zigbee device.
- **Secure session**: Enables and configures the secure session of the XBee 3 RF device.

Note You can hide and show specific quick actions in the **Configure** menu and rearrange the cards by dragging and dropping them in the place you want.

Configuration

This section describes how to configure your XBee device and change any AT setting to modify its behavior, update its firmware to get the latest features or apply an XBee profile to it.

Settings

This page lists all AT settings supported by your XBee device. They are divided into sections or categories, each including a short description. You can click on each category to expand or collapse it.

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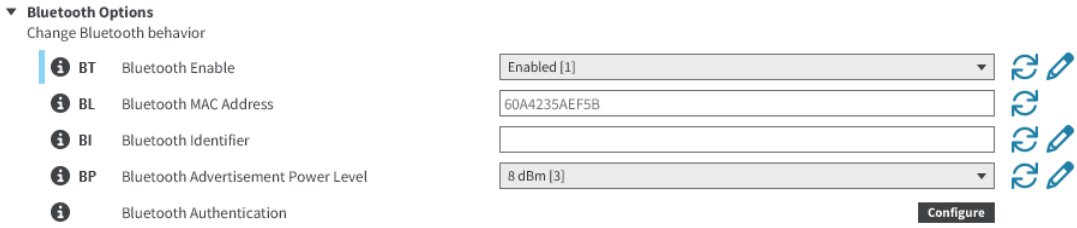

Each setting has the following controls:

- **Information button**. Clicking the information button displays a short description of the setting, including the default value and the valid range, if the setting is numeric.
- **AT parameter**. Displays the associated AT parameter of the setting. Some settings, such as actions, may not have an associated AT parameter.
- **Setting name**. Displays the name of the setting.
- **Setting configuration control**. Contains the text box or combo box where the setting value must be entered or configured. In read-only settings, the value is grayed out and the control is not editable.

  You can hover over the text box of a numeric setting to display the valid range for that setting. Always enter numeric values in hexadecimal format–without the '0x' prefix–unless the hover text indicates that an ASCII value is required.

  If the setting is configured with an invalid value, an explanation for the error appears.
- **Units label**. Displays the units of measure for that setting. Not all settings have a units label.
- **Value calculator button**. Clicking the value calculator button launches a time or bitfield calculator for numeric settings that are difficult to compute. The content of the calculator panel depends on the setting. Not all settings have a value calculator button.
- **Refresh and write buttons**. Clicking the refresh button or write button allows you to read or write the value of the setting. Some settings, such as the read-only settings, do not have a write button.

Read settings

This action reads the values of all of the settings of the device at once. To do so, click the **Read all device settings** button.

Write settings

This action writes the values of all of the settings of the device that have changed. To do so, click the **Write all device settings** button.

Load default settings

This action loads the default radio firmware settings on the device.

Click the **Reset all settings to default values** button.
Default values are loaded but not written on the device. In order to write them, click the **Write all device settings** button.

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Search settings

This action searches for the setting associated to the entered AT command. To do so, click the search box and enter the AT command of the setting to search. If found, the tool will highlight the setting and move the view to it.

Expand or collapse all categories

This action expands or collapses all categories of the page. To do so, click the **Expand all categories** or **Collapse all categories** buttons.

Show not default settings

This action filters the settings and shows only those with a not default value written in flash. To do so, click the **Show not default settings** button. To show all settings again, click the **Show all settings** button.

Firmware update

This page allows you to update the firmware or change the protocol of your XBee device.

Select your XBee product

The first thing you see when opening this page is the product selector control. Use it to select the XBee product you have—based on product name and image—and the target firmware version to update it.

Only the available and valid products and firmware versions will be visible. For example, if the current device is an XBee Cellular, the product selector won't show any other XBee products other than XBee Cellular.

Once a firmware version has been selected, an icon on the top right corner of the firmware version box is enabled. When clicked, it displays the release notes of the selected firmware version on your default PDF viewer application .

Start the update

Before updating, you can:

- Check the **Reset to defaults after flashing firmware** checkbox to update to a clean version of the selected firmware without any previous configurations.
- And, for local cellular devices only, you can force a modem update to any of the available modem versions associated to the selected firmware version.

Finally, click **Start** update to initiate the firmware update process.

Inspect the update process

When the update process starts, the "update in progress" page slides in from the right to show a better layout to display the update process.

On the top section of the page, there is a header with information about:

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- The former configuration of the device (left side).
- The new one to be flashed (right side).

The main part of the interface contains a big outline of an XBee device that acts as a progress indicator and a text that indicates the different tasks that take part in the update process.

Note The progress indicator is reset with any major task of the process, so a full update may reset the progress indicator a couple of times.

Also, on the right side of the page, there is a toggleable container with the details of the process. You can click on it at any time to see the different steps and the full log of the update process.

Whenever the update finishes, either by success or error, the progress indicator will be updated with an icon representing the result. At this point, if the update was successful, you can keep working with the device the same way as before starting the update process or, if the update reported an error, you can open the details container to debug and identify its cause.

Finally, after an update process is finished, you can always click on the **Back** button below the main icon and the task name to reload the XBee product selector control and start over with a new update process.

Profile update

This page allows you to select and apply an XBee profile to the current XBee device.

Select the profile to apply

To apply a profile to your current device:

1. Click the **Load profile** button.
2. Then, select the desired profile in the system explorer to load and inspect it.
3. Once the profile is loaded into the page, the basic information of the profile will appear below with a link to see the full profile information in the profile editor tool.
4. Finally, click the **Apply profile** button.

Note To apply a profile to a device, first you need a profile. This page assumes that this profile already exists. If that is not the case, use the link under the profile browser control to create one.

Inspect the apply profile process

When the apply profile process starts, the **apply profile in progress** page slides in from the right to show a better layout for the apply profile process.

On the top section of the page, there is a header with the configuration of the profile that is being flashed to the device. This configuration includes:

- The XBee protocol of the firmware version of the profile
- Firmware and hardware versions
- Indicators of whether the profile includes settings, firmware update and/or file system
- Profile name and description

The main part of the interface contains a big outline of an XBee device that acts as a progress indicator and a text that indicates the different tasks that take part in the apply profile process.

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Note The progress indicator is reset with any major task of the process, so a full profile update may reset the progress indicator a couple of times.

Also, on the right side of the page, there is a toggleable container with the details of the process. You can click on it at any time to see the different steps and the full log of the apply profile process.

Whenever the process finishes, either by success or error, the progress indicator will be updated with an icon representing the result. At this point, if the process was successful, you can keep working with the device the same way as before starting the apply profile process or, if the process reported an error, you can open the details container to debug and identify its cause.

Finally, after the process is finished, you can always click on the **Back** button below the main icon and the task name to reload the profile browser page and start over with a new apply profile process.

Diagnostics

This section describes how to perform diagnostic tests to evaluate the RF range and link quality between two devices, measure the spectrum of any RF band and measure the transfer ratio between two devices.

Range test

This page allows you to perform a range test, which demonstrates the real-world RF range and link quality between two XBee devices in the same network. Since communication between XBee RF devices takes place over the air, the quality of the wireless signal can be affected by many factors: absorption, reflection of waves, line-of-sight issues, antenna style and location, etc. During a range test, XBee Studio sends data packets from the local XBee device to the remote device and waits for the echo to be returned from the remote to the local. The tool counts the number of packets sent and received by the local device and measures the signal strength of both sides as an RSSI (Received Signal Strength Indicator) value. Every sent packet from the local XBee should be received again as an echo by the same local XBee.

Note When deploying an actual network, perform multiple range tests to analyze varying conditions in your application.

Configure the test

When you open the range test page and you have not selected a remote device yet, the range test configuration dialog appears. You can also open this dialog from the toolbar by clicking the

Configure range test button while the test is stopped.

First, you need to select a remote device from the network. If no devices are listed in the control, click the **Discover remote devices** button to perform a network discovery and wait for the remote devices to be discovered and added to the list. Then, select the desired device to perform the range test with.

Optionally, you can also configure the following test options:

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Configuration	Description
Range test type	Determines the type of range test to perform. Available options include: ▪ **Software loopback (Cluster ID 0x12)**: Performed using explicit addressing frames/packets directed to the Cluster ID 0x12 on the data endpoint (0xE8), which returns the received data to the sender. Not all protocols and operating modes support the Cluster ID 0x12 range test. XBee Studio displays an error message for unsupported devices. ▪ **Hardware loopback (jumper)**: Performed using the serial port/USB hardware loopback capabilities. Before initiating this range test, you must configure the remote device to work in transparent mode and close the loopback jumper. Works only with remote devices in AT operating mode.
Packet payload	Sets the packet payload that will be sent to the remote device during range test. Opens a new window for ASCII/HEX input.
Rx timeout (ms)	Sets the maximum time in milliseconds to wait for response from the remote device before considering a packet to be lost.
Tx interval (ms)	Sets the minimum time in milliseconds to wait before sending a new packet to the remote device.
Test duration	Configures the test duration by time (in seconds), number of packets or infinitely.
Skip RSSI measurements	When checked, the test skips the RSSI measurements. Note that you can only skip them when your local device is in AT (transparent) mode.

Run the test

Once the remote device is selected, click the Start button if you are in the configuration dialog or the **Start range test** ▷ button located in the toolbar to begin the range test.

XBee Studio represents range test data in different ways:

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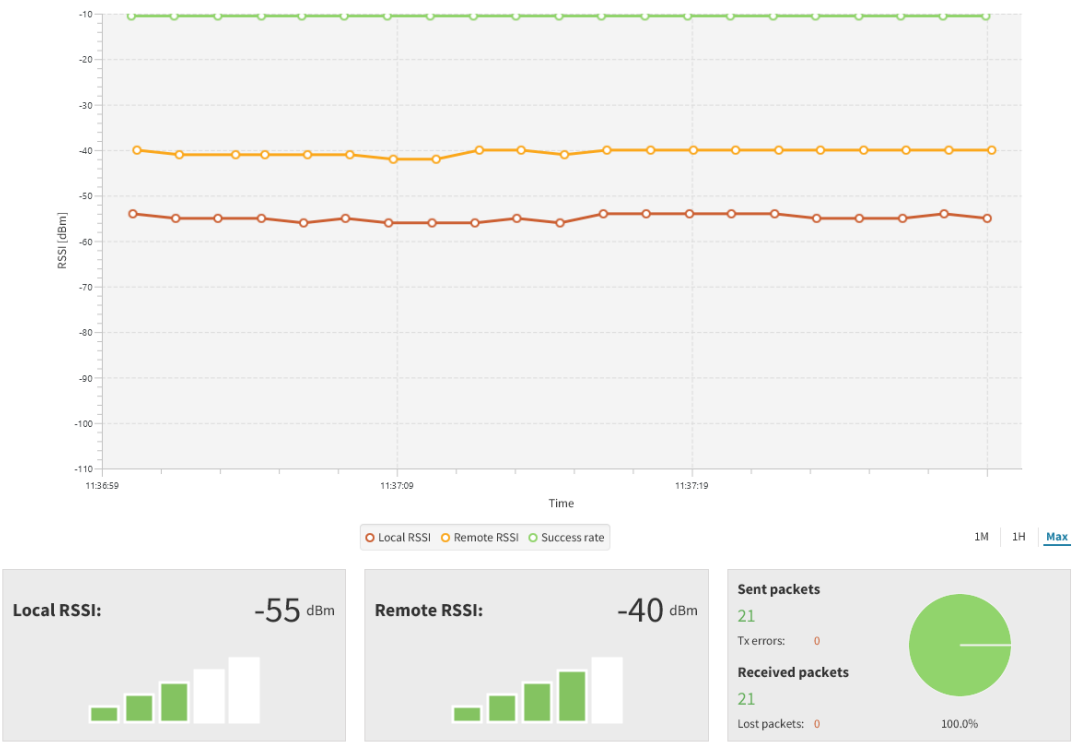

- **RSSI chart**: Represents the RSSI values of the local and remote devices during the range test session. The line graph also contains the percentage of success for the total packets sent.

  You can hide/show chart data by checking or unchecking Local RSSI, Remote RSSI, and Success rate in the legend. You can also change the visible time window of the chart to 1 minute (1M), 1 hour (1H) or maximum window (Max), as well as pan/zoom on the chart and see the value of each point hovering over it.
- **Local RSSI**: Displays instant RSSI value of a local device, in dBm, for the last packet received by the local XBee device.
- **Remote RSSI**: Displays instant RSSI value of a remote device, in dBm, for the last packet received by the remote XBee device. When the local device is working in AT (transparent) mode, XBee Studio cannot read the remote device RSSI value.
- **Packet summary**: Displays total number of packets sent and received, transmission errors, and packets lost. It also displays the percentage of success sending and receiving packets during the range test session.

You can stop the test at any time by clicking the **Stop range test** button of the toolbar.

Special considerations

There are some special considerations to be aware of while working with the range test tool:

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- When the local device is working in AT (transparent) mode, the tool automatically performs configuration steps in the device before starting the range test, and after finishing or stopping it. A progress bar shows the level of completion for this process.
- When the local device is working in AT (transparent) mode, it is not possible to read the remote device RSSI value.
- The hardware loopback range test type only works with remote devices in AT (transparent) operating mode.
- When performing a hardware loopback range test, you need to connect the loopback jumper or the loopback adapter in the remote device before starting and disconnect it after finishing. A dialog box notifies you of the action required.

Export the test results

Once you finish the range test, you can export the results in CSV format by clicking the **Export range test session** button of the toolbar.

Spectrum analyzer

This page allows you to test and measure the spectrum of the radio band your XBee device operates in. The tool reports the noise level of each channel indicating its best, worst and average measures.

Analyze the spectrum

Click the Start spectrum analysis button to start the analysis. The analysis ends after 60 seconds, but you can change the duration and the sampling interval by clicking the **Configure spectrum analysis** button. You can also stop the analysis at any time by clicking the **Stop spectrum analysis** button.

When an analysis begins, the chart and channels list display the RF channels supported by the XBee device. The chart represents the noise level of all the RF channels. Each channel displays one bar with the current noise level and two little marks representing the highest noise level (blue) and the lowest noise level (red). A black line indicates the average noise level of all the channels. The spectrum analysis refreshes the noise levels of each channel continuously until the analysis ends or is stopped.

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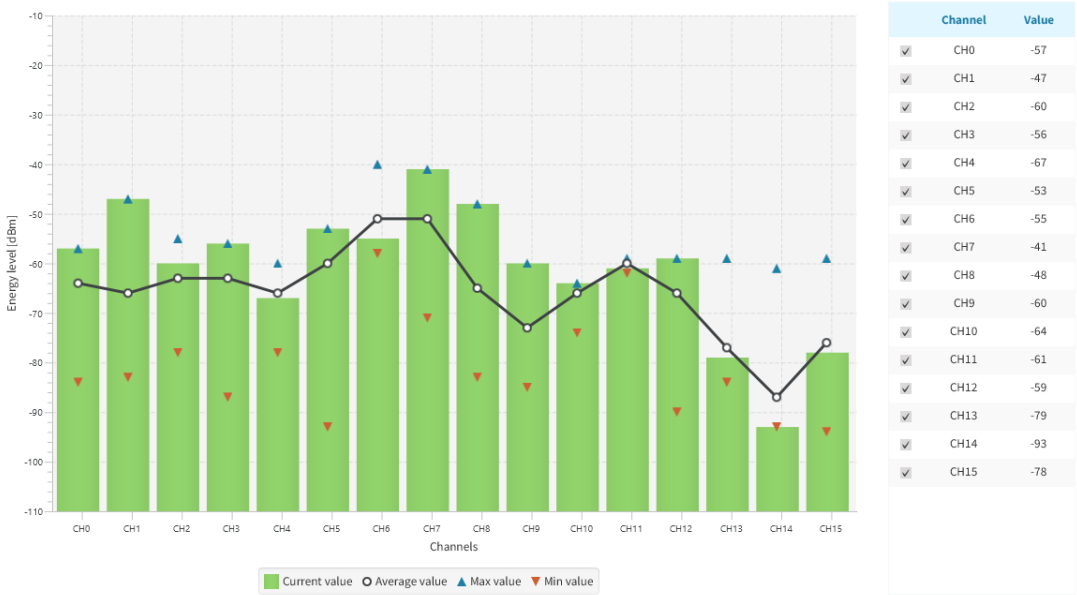
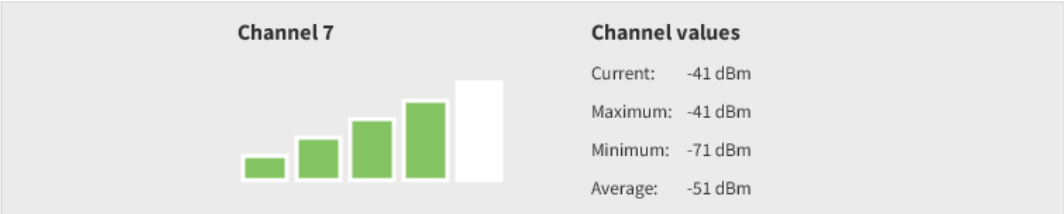


You can use the chart filters of the legend to hide or display the bars, the best and worst noise level values and the average noise level line. Also, you can hide any channel from the chart by clicking its checkbox from the list of channels located at right.

If you click a channel from the chart or the list of channels, the channel area displays the instant noise level of the selected channel as well as its average, best and worst noise level.



The right panel displays the total number of noise level samples read by the XBee device.

Export the analysis results

Once you finish the spectrum analysis, you can export the results in CSV format by clicking the **Export spectrum analysis** button of the toolbar.

Throughput test

This page allows you to measure the transfer ratio between two XBee devices in the same network. During a throughput test, XBee Studio sends data packets from the local XBee device to the remote device and waits for the echo to be returned from the remote to the local. The tool reports the instant transfer ratio and the average transfer ratio.

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Configure the test

When you open the throughput test page and you have not selected a remote device yet, the throughput test configuration dialog appears. You can also open this dialog from the toolbar by clicking the **Configure throughput test** button while the test is stopped.

First, you need to select a remote device from the network. If no devices are listed in the control, click the **Discover remote devices** button to perform a network discovery and wait for the remote devices to be discovered and added to the list. Then, select the desired device to perform the range test with.

Note If the local device is in AT (transparent) operating mode, you need to have a secondary device connected to your computer and in the same network as the local one in order to perform a throughput test.

Optionally, you can also configure the following test options:

Configuration	Description
Throughput test type	Determines the type of throughput test to perform. Available options include: ▪ **Unidirectional**: Sends data from the local device to the remote device. Before sending the next packet of data, it waits for the transmission status of the previous one. ▪ **Bidirectional (Cluster ID 0x12)**: Sends data from the local device to the remote one and waits for the data receipt from the remote device. The transmission is performed using explicit addressing frames/packets directed to the Cluster ID 0x12 which returns the sent message. Note Not all protocols and operating modes support this test type. Devices that do not support it display an error at the top of the dialog. ▪ **Bidirectional (Loopback)**: Similar to the previous mode, this one also waits for the data back from the remote device before sending the next block of data. The data back is performed using the serial port/USB hardware loopback capabilities. Note This method is only valid if the remote device is in AT (transparent) operating mode and requires specific user actions; see specific actions below.
Packet payload	Sets the packet payload that will be sent to the remote device. Opens a new window where you can configure different payload values by operating mode of the local device (AT or API). Note In API mode the payload length is limited by the protocol. In AT mode the payload length is unlimited.
Transmit timeout (ms)	Sets the time that the throughput test waits to receive the transmit status packet (when the throughput type is unidirectional) or the data back from the remote device (when the throughput type is bidirectional). The bigger the

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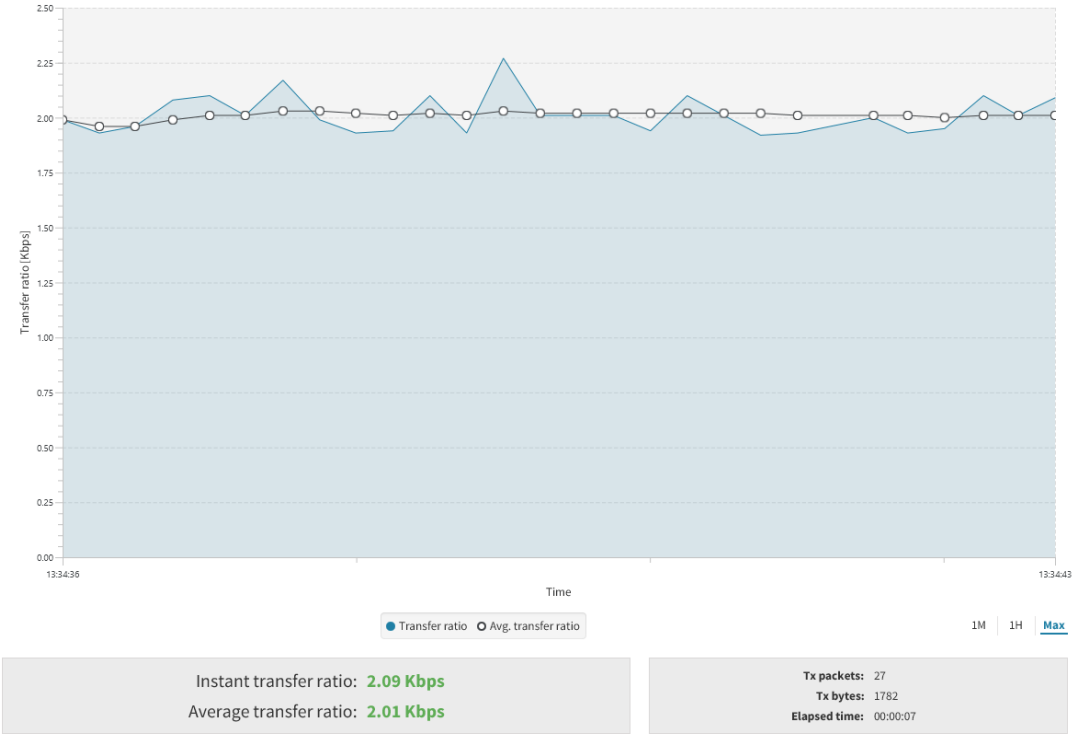
Configuration	Description
	payload is the greater this time should be.
Test duration	Configures the test duration by time (in seconds), number of packets or infinitely.

Run the test

Once the remote device is selected, click the Start button if you are in the configuration dialog or the **Start throughput test** button located in the toolbar to begin the throughput test.

XBee Studio represents throughput test data in different ways:



- **Transfer ratio chart**: Displays the instant transfer ratio with a light blue area and the average transfer ratio as a black line. The instant transfer ratio is calculated every 250ms or every time a packet is sent if sending takes longer than 250ms. You can hide/show chart data by checking or unchecking Transfer ratio and Avg. transfer ratio of the legend.
- **Transfer ratio values**: Displays the instant and average transfer ratio as packets are sent to the remote device during the session.
- **Session statistics**: Displays session statistics such as the number of packets sent to the remote device, the number of transferred bytes, and the duration of the session.

You can stop the test at any time by clicking the **Stop throughput test** button of the toolbar.

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Special considerations

There are some special considerations to be aware of while working with the throughput test tool:

- When the local device is working in AT (transparent) mode, the tool automatically performs configuration steps in the device before starting the throughput session, and after finishing or stopping it. A progress bar shows the level of completion for this process.
- The Bidirectional (Loopback) throughput test type only works with remote devices in AT (transparent) operating mode.
- When performing a Bidirectional (Loopback) throughput test, you need to connect the loopback jumper or the loopback adapter in the remote device before starting and disconnect it after finishing. A dialog box notifies you of the action required.

Export the test results

Once you finish the throughput test, you can export the results in CSV format by clicking the **Export throughput test session** button of the toolbar.

Development

This section describes how to interact with the MicroPython REPL of your XBee device, communicate with it using API frames or modify its file system.

MicroPython Terminal

This page allows you to communicate with the MicroPython stack of your current device through the serial interface and now, also, through the cloud interface–if the connection with the device is done through the cloud.

Note Make sure your device supports MicroPython.

The page has the following controls:

- **Toolbar**. Located on the top of the page. It contains the following elements:

- **Open/Close connection button**. This toggle button switches the connection status of the device from connected to disconnected and vice-versa. By default, it appears disconnected.
- **Serial port line status indicator**. Displays the status of the RS-232 hardware flow control lines. Green indicates that the line is asserted, while white indicates that it is de-asserted. You must open the console connection to display the line status and enable the line status control.

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You can view and manage the following lines from the line status indicator:

Line ID	Line name	Description
CTS	Clear to send	Indicates that the connected device is ready to accept data.
CD	Carrier detect	Detects the presence of connection.
DSR	Data set ready	Indicates that the connected device is ready for communication.
DTR	Data terminal ready	Indicates that the terminal is ready for communication.
RTS	Ready to send	Requests that the connected device prepare to receive data.
BRK	Break	Engages the serial line break. Asserting this line places the DI line high, preventing data from being sent to the radio.

- **Terminal log**. This is the main section of the page. By default and, until the connection with the device is established, it appears disabled. Once the device is connected, the main control is enabled and the caret of the terminal appears and starts blinking. On the top right corner you should see the following buttons:
  - **Clear log button** . Click on this button to clear the logs of the terminal log control.
- **Connection indicator**: Displays the connection information. Depending the connection type the information will contain:
  - The icon of a serial connection, the port name and the rest of the serial port parameters of the connection and operating mode of the device.

    Serial connection
    COM6 - 115200/8/N/1/N - AT

  - The icon of a Digi Remote Manager connection, the Digi Remote Manager account the device is registered into and the Device ID of the device.

    Remote Manager connection
    logrotest - 03564411-19273205

Start a terminal session

By default, the first time you open the terminal it is disconnected, as indicated by the gray background of the terminal log and the disabled serial port status line control.

1. Click **Open** to establish communication with the device corresponding to the terminal. If it is the first time you are connecting and it is not in MicroPython REPL mode, you should be prompted a dialog to enable such mode before connecting. After that, the Open button icon

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changes to indicate the device is connected and the serial port status line and the terminal log controls are enabled.

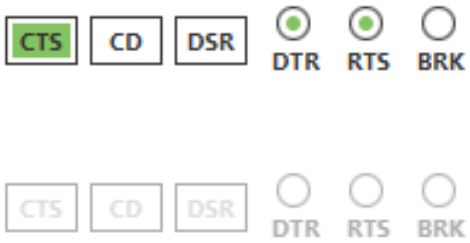
2. At this point, all MicroPython logs of the application running in the device are captured and displayed in the terminal log control. If the device is not running any MicroPython application, nothing should be printed in the terminal log.
3. If you want to work with the MicroPython REPL, you should:
   a. Press <**ENTER**> on the terminal log if the device is not running a MicroPython app. The MicroPython REPL prompt should appear for you to start working with it.
   b. Stop running the MicroPython app by pressing **Ctrl+C**. The MicroPython REPL prompt should appear for you to start working with it.

XBee console

This page allows you to communicate with your current local device through the serial interface. The page has the following controls:

- **Toolbar**. Located on the top of the page. It contains the following elements:

  - **Open/Close connection button**. This toggle button switches the connection status of the device from connected to disconnected and vice-versa. By default, it appears disconnected.
  - **Serial port line status indicator**. Displays the status of the RS-232 hardware flow control lines. Green indicates that the line is asserted, while white indicates that it is de-asserted. You must open the console connection to display the line status and enable the line status control.



You can view and manage the following lines from the line status indicator:

Line ID	Line name	Description
CTS	Clear to send	Indicates that the connected device is ready to accept data.
CD	Carrier detect	Detects the presence of connection.

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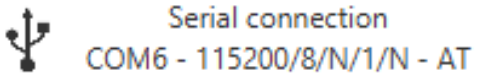
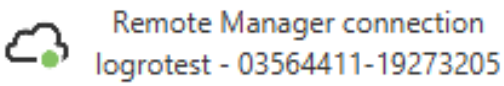
Line ID	Line name	Description
DSR	Data set ready	Indicates that the connected device is ready for communication.
DTR	Data terminal ready	Indicates that the terminal is ready for communication.
RTS	Ready to send	Requests that the connected device prepare to receive data.
BRK	Break	Engages the serial line break. Asserting this line places the DI line high, preventing data from being sent to the radio.

- **Console log**. This is the main section of the page. By default and, until the connection with the device is established, it appears disabled. Once the device is connected, the main control is enabled and the caret of the console appears and starts blinking. On the top right corner you should see the following buttons:
  - **Load console session button** . Click this button to load a console session .log file into the console log control.
  - **Save console session button** . Click this button to save the sent and received data from the current console session. With this feature, both, raw data and API frames, will be exported to a .log file for later usage.
  - **Scroll lock button** . This is a toggle button to enable/disable the scroll lock functionality of the console log control.
  - **Clear log button** . Click on this button to clear the logs of the console log control.
  - **Connection indicator**: Displays the connection information. Depending the connection type the information will contain:
    - The icon of a serial connection, the port name and the rest of the serial port parameters of the connection and operating mode of the device.



    - The icon of a Digi Remote Manager connection, the Digi Remote Manager account the device is registered into and the Device ID of the device.



- **Send data control**. Expandable control that, when clicked, it slides up to show the necessary controls to create and reorder the raw data packets or API frames to be sent to the current device. If clicked again, it is collapsed to hide the inner controls. This control

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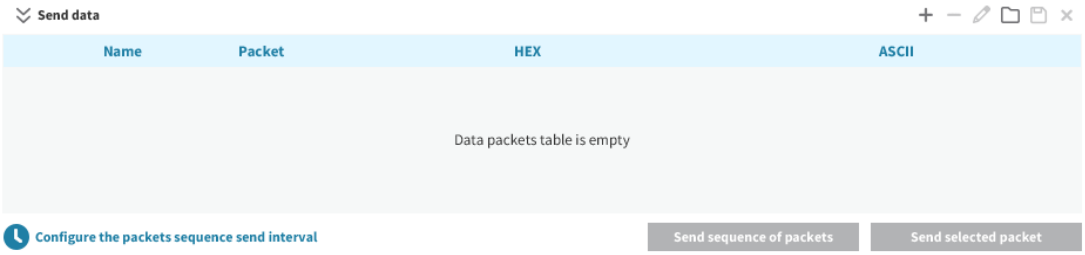
layout goes as follows:



- **Data packets table**. This is the control where the raw data packets or the API frames are added. You can select any or all packets that appear in this table to send them to the current device at any time. There are some controls on the top right corner of the table to manage its elements:
  - **Add new packet button**. Adds a new raw data packet or API frame to the table of packets to send.
  - **Remove selected packet button**. Removes a frame from the table of packets.
  - **Edit selected packet button**. Changes the name or contents of a packet.
  - **Load packets list button**. Loads a saved list of packets.
  - **Save packets list button**. Saves the list of packets to be used in future sessions or on another computer.
  - **Clear packets list button**. Clears the entire packets table.
- **Send sequence of packets button**. Click this button to send all of the packets in the data packets table in the same order as they appear listed in the table. Only enabled when there is, at least, one packet or API frame in the table.
- **Send selected packet button**. Click this button to send just the selected packet from the data packets table. Only enabled when there is, at least, one packet or API frame selected in the table.
- **Configure the packets sequence send interval button**. When clicked it opens a popup to allow the configuration of the sequence of packets to send. It contains the following fields:

- **Transmit interval field**. To indicate the amount of time to wait between each packet transmission. By default, the transmit interval is set to 500 ms.
- **Repeat sequence control**. You can select whether to repeat the sequence endlessly or a number of times. By default, it only sends the sequence of packets once.

Start a console session

By default, the first time you open the console of the device it is disconnected, as indicated by the gray background of the console log and the disabled serial port status line control.

1. Click the **Open** button to establish communication with the device. After that, the Open button icon changes to indicate the device is connected and the serial port status line and the console log controls are enabled.

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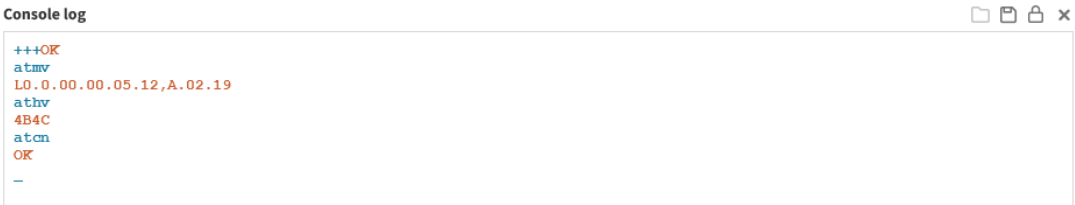
2. At this point, all incoming data packets or API frames, if any, are captured and displayed in the console log control.

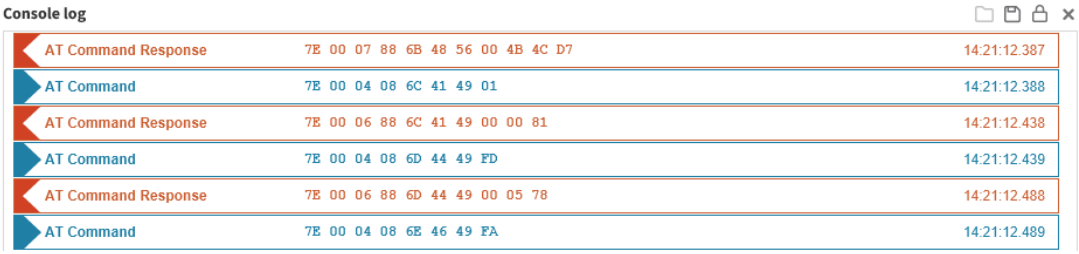
Inspect the console log data

Once the connection has been established, all data will be logged in the console log control. It does not matter if the data comes in frame format or if it is raw.

- If data is raw, for example, when working in command mode with the device or sending or receiving data when the device is in AT mode, it will be displayed as follows:



- And if data comes in frame format, for instance, when working in API or API2 modes, each frame will be represented as a box containing the frame type, the content of the frame in hexadecimal format and the time when it was logged:



This view is the same for both types of packets–raw or API frames. For example, if your module is working in API mode but you were configuring it or reading data using command mode when a packet arrives or when you decide to send a frame, it all gets represented without changing the view:

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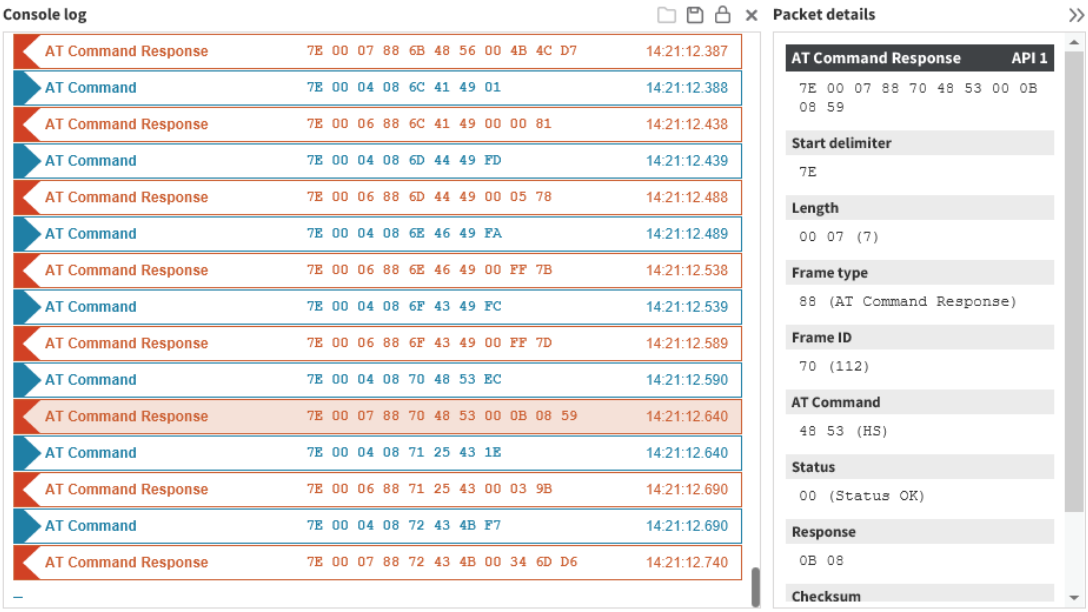


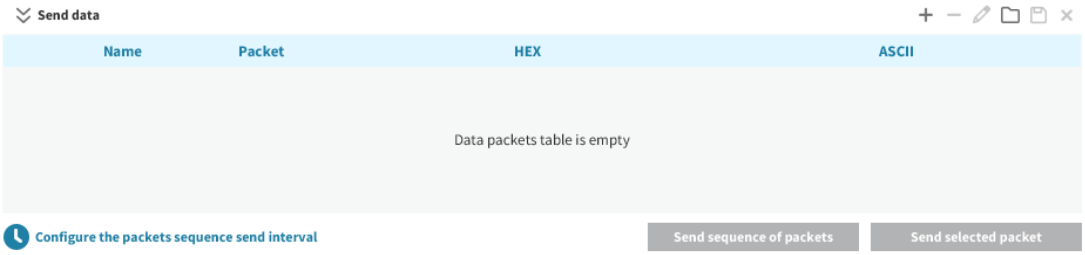
Also, you can see the decoded content of each frame by clicking on it. When you click on a frame box, the packet details viewer slides in from the right to occupy part of the layout. This allows you to see the console log while inspecting each packet individually.

Send packets

Depending on the operating mode of your device, you'll be able to create and send a different kind of packet.
When the module is operating in AT mode...

You can send data byte by byte, or you can send a set of bytes–a data packet. To send a data packet, you must first create one. By default, the data packets list is empty.

1. Click the **Send data** section to expand it.



2. Click the **Add a packet** button in the send data section. The Add a data packet popup appears:

3. Enter the name of the data packet to be added to the list.

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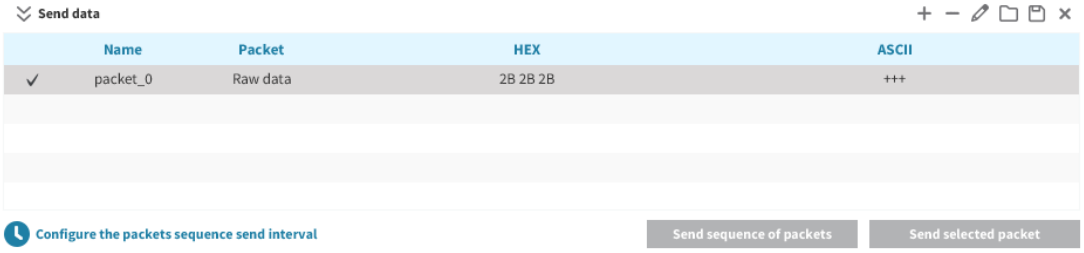
4. Paste or type in your data. You can use the tabs to toggle between ASCII and HEX input views.

5. Click **Add packet**. The popup is closed and the data packet appears in the table of packets. Repeat the operation to add additional packets to the list.

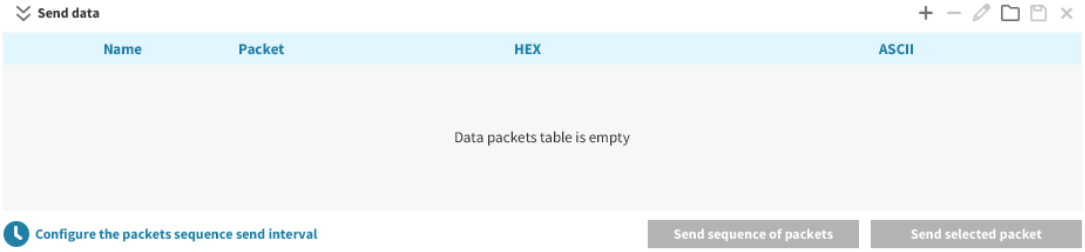


6. When finished, you can send a single packet or a sequence of packets.

When the module is operating in API mode...

You can send data in an API frame. An API frame is the structured data sent and received through the serial interface of the radio module when it is configured in API or API escaped operating modes. API frames are used to communicate with the module or with other modules in the network. To send an API frame, you must first create one.

1. Click the **Send data** section to expand it.



2. Click the **Add a packet** button in the send data section. The Add a data packet popup appears:

3. Enter the name of the frame to be added to the list.
4. Create a frame by doing one of the following:
   a. Paste or type in the byte array of the API frame.
   b. Use the API frames generator functionality.

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i. Click the **Create an API frame** button to expand the API frames generator control.
ii. Fill out the required fields to generate the frame.

5. Click **Add packet**. The popup is closed and the API frame appears in the table of packets. Repeat the operation to add additional frames to the list.

6. When finished, you can send a single frame or a sequence of frames.

XBee File System

This page allows to you access and interact with the file system of your XBee device through the serial interface and now, also, through the cloud interface—if the connection with the device is done through the cloud.

Note Make sure your device supports the file system feature.

The page is divided into three parts:

- **Toolbar**: Allows formatting the XBee file system.
- **PC file system view (left)**: Shows the current path of your computer and its contents.
- **XBee file system view (right)**: Shows the current path of the XBee device and its contents as well as the free and total size of the file system.

Interact with the XBee file system

When you access the file system page, XBee Studio connects to the device and automatically loads or refreshes the contents of the specified XBee file system path.

You can perform the following operations:

Operation	Description
Navigate	Navigate through the different directories by double clicking on them. To go back, double click on the parent directory (..) or press the backspace key. You can also go directly to a specific path by typing it on the local/remote path text box and pressing enter.
Upload	Upload a file or directory to the XBee device. Drag-and-drop or right-click on a file

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Operation	Description
	or directory on the local file system view and then click **Upload**. If you want to upload several files or directories, select and drag them to the XBee file system view.
Upload a secure file	Upload special files, such as certificates or keys, as write-only. Once the files are uploaded to the XBee, they cannot be downloaded, renamed or moved; only deleted. These secure files are displayed in the XBee file system with a lock and are grayed out. Note Secure files cannot be uploaded through the cloud interface.
Download	Download a file or directory from the XBee device. Drag-and-drop or right-click a file or directory on the remote file system view and then click **Download**. If you want to download several files or directories, select and drag them to the local file system view.
Create directory	Create a directory. Right-click on either the local or remote file system view and click **Create directory**. You are asked to enter the name of the new directory.
Delete	Delete any file or directory. Right-click a file or directory and click **Delete**. You are asked to confirm the operation.
Rename	Rename any file or directory. Right-click a file or directory and click **Rename**. You are asked to enter the new name of the file or directory.
Get and compare hash	Get the SHA256 hash of any file that is on the XBee file system and compare it with the hash of a local file. This operation is specially useful with secure files because they cannot be downloaded, so this allows you to verify that the secure file is actually equal to other located on your computer. Right-click on a file and click **Get hash** or **Compare hash**. Note This functionality is not available through the cloud interface.
Format	Re-format the entire XBee file system by clicking the Format button located in the toolbar. Note This process erases all your files on the XBee module and cannot be undone.

Note Not all operations are supported in all XBee devices.

Network

This section describes how to discover the devices of the network your local device is connected to, analyze the connection qualities between the different nodes, and configure or update any remote device.

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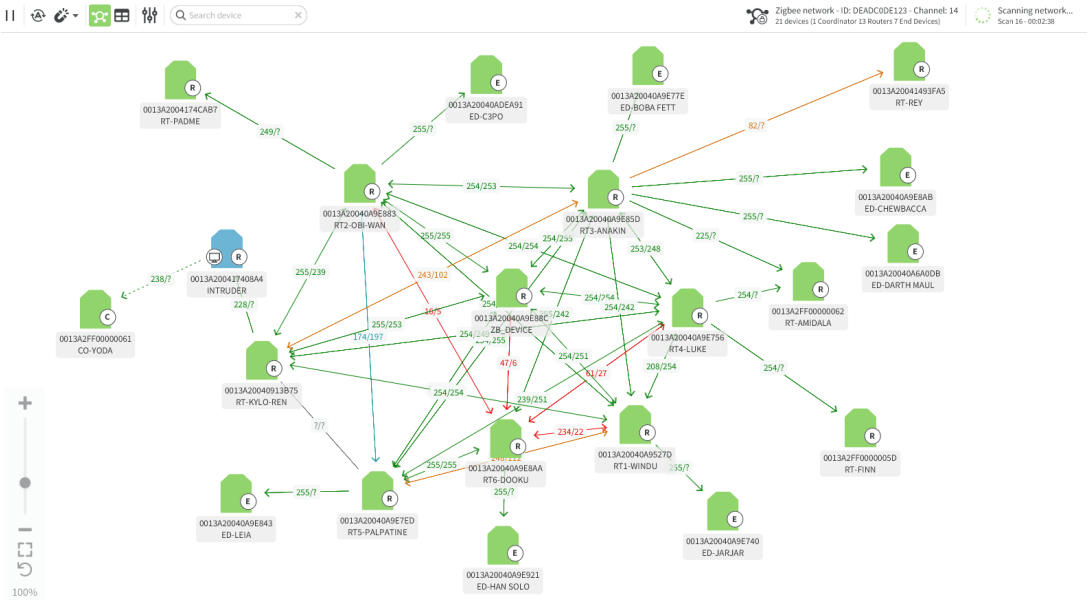
Network topology

This page allows you to discover and see the topology of the network your XBee device is connected to.

Note The Network Topology page only works if your device is in API operating mode. If it is not, XBee Studio will ask you to change the mode before discovering the network.



When you open the Network Topology page for the first time, XBee Studio automatically starts an endless network discovery with the selected XBee device. You can stop the process at any time by clicking the **Stop network discovery** button and resume it by clicking the **Start network discovery** button of the toolbar.

When a network discovery is taking place, the right side of the toolbar shows information about the network (PAN ID, channel and number of devices) as well as the number of scans performed and the total time since the beginning.

Remote devices are dynamically added to the panel as they are found in two different layouts:

- Graphic view
- Table view

Graphic view

By default, XBee Studio shows the devices as nodes. Every device shows its 64-bit address, name and role in the node. Remote devices are displayed in green while the local device is displayed in blue.

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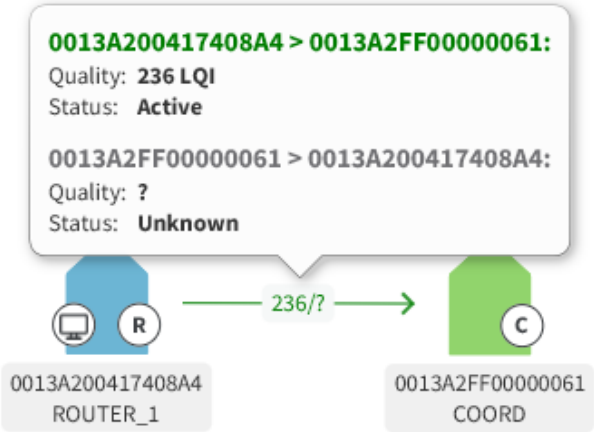
Note In case you are in the table view, click the **Switch to graphic view** button of the toolbar to switch to this view

When hovering over a device, XBee Studio shows some buttons with the most common actions you can do with it. You can also click the device itself to go to the device Dashboard.

Each node is connected to its neighbors with solid lines (active connections) or dotted lines (undiscovered connections), with arrows indicating the direction of communication. The line color indicates the link quality, displayed also in the center of the line. You can click the line or the label to see detailed information about the connection in the two directions.



Depending on the protocol of the XBee devices, consider the following differences in node display:

- **Zigbee**: Link quality is represented by Link Quality Indication (LQI), a number between 255 and 0 where 255 is the strongest and 0 is the weakest.
- **DigiMesh**: Link quality is represented in decibel-milliwatts (dBm), a number between 0 and -100 where 0 is the strongest and -100 is the weakest.
- **802.15.4**: XBee Studio does not display the quality of the connection between two nodes. The nodes displayed are in the RF range of the local device.

Note When a device leaves the network, some neighbors continue to store information about their relationship. When you perform a new discovery, the device appears because of the preserved information but the device is unreachable if you attempt to verify the connection. These devices are grayed out and you cannot work with them.

Visualization settings

When you are in the graphic view, you can adjust several settings related to the visualization of the nodes:

- **Pan and zoom**: Move the visualization area by clicking and moving your mouse, and zoom in/out with the mouse wheel or the slider located in the left bottom part of the page. You can also center the view to the existing devices or reset it to the default zoom level .

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- **Auto layout**: When you enable this option, devices are automatically arranged in real time dynamically (enabled by default).
- **Device separation**: Configure the distance between the devices.
- **Search device**: Search for specific devices in the network by entering part or full address, name or role in the search box.

Table view

XBee Studio can also display the available devices in table format instead of graphically, which can be useful if you have a large network or you want to display the devices in a more organized way.

To switch to this view if you are in the graphic view, click the **Switch to table view** button of the toolbar.

As in the graphic view, the table view shows basic information about each device and allows you interact with their most common functionality. It also shows a button on each device to see a list of its connections.

Note You can click any device of the table to access the device's Dashboard.

Explore other functionality

XBee Studio also offers a more simple and step-by-step way to access the different functionality of the tool. When you click on any item of the sidebar, XBee Studio expands the selected category and lists the available operations you can do. If the operation applies to a device, you will be asked to select one in the next step.

The available categories are:

Configuration 57
Diagnostics 57
Development 60
Remote Manager 63
Utilities 64

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Configuration

This section allows you to configure your XBee device and change any AT setting to modify its behavior, update its firmware to get the latest features or apply an XBee profile to it.

The available operations in this category are:

- Settings
- Firmware update
- Profile update

Diagnostics

This section allows you to check the health of your XBee device, evaluate if something is not working as expected and recover the device if it has a damaged firmware or is running in programming mode.

The available operations in this category are:

- XBee recovery
- XBee Trace Logger
- Range test
- Spectrum analyzer
- Throughput test

XBee recovery

This page allows you to force a firmware update on XBee devices with damaged firmware or recover a device from programming mode.

The following table provides descriptions of the fields in the XBee recovery:

Field	Description
Serial port	Serial port where the XBee device to recover is connected.
XBee product	Type of XBee device to recover.
Firmware version	Firmware version to flash to the XBee device to recover. The most recent firmware version appears at the top of the list.

Recover a radio module

Follow these steps to recover an XBee device:

1. Select the serial port where the XBee device to recover is connected. If your port is not listed, you can use the refresh button to obtain a new list of serial ports.
2. Specify the product type of the XBee device.
3. Select the firmware you want to flash during the recovery.
4. Click **Start update** to program the new firmware in the XBee device.

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Note For cellular devices, there is a checkbox below the control that allows you to force a modem update to any of the available modem versions associated to the selected firmware version.

If XBee Studio displays a dialog asking you to reset your device, reset it and wait for the dialog to close.

Inspect the update process

When the update process starts, the **update in progress** page slides in from the right to show a more appropriate layout for the update process.

On the top section of the page, there is a header with the former configuration of the device (left side) and the new one to be flashed (right side).

The main part of the interface is occupied by a big outline of an XBee device that acts as a progress indicator and a text that indicates the different tasks that take part in the update process.

Note The progress indicator is reset with any major task of the process, so a full update may reset the progress indicator a couple of times.

Also, on the right side of the page, there is a toggleable container with the details of the process. You can click on it at any time to see the different steps and the full log of the update process.

Whenever the update finishes, either by success or error, the progress indicator will be updated with an icon representing the result. At this point, if the update was successful, you can keep working with the device the same way as before starting the update process or, if the update reported an error, you can open the details container to debug and identify its cause.

Finally, after an update process is finished, you can always click on the **Back** button below the main icon and the task name to reload the XBee product selector control and start over with a new recovery process.

XBee Trace Logger

This tool allows you to inspect and analyze all XBee API packets that are sent and received by one or several XBee devices. It is located in the bottom part of the application and can be expanded and used at any time while working with other parts of XBee Studio.

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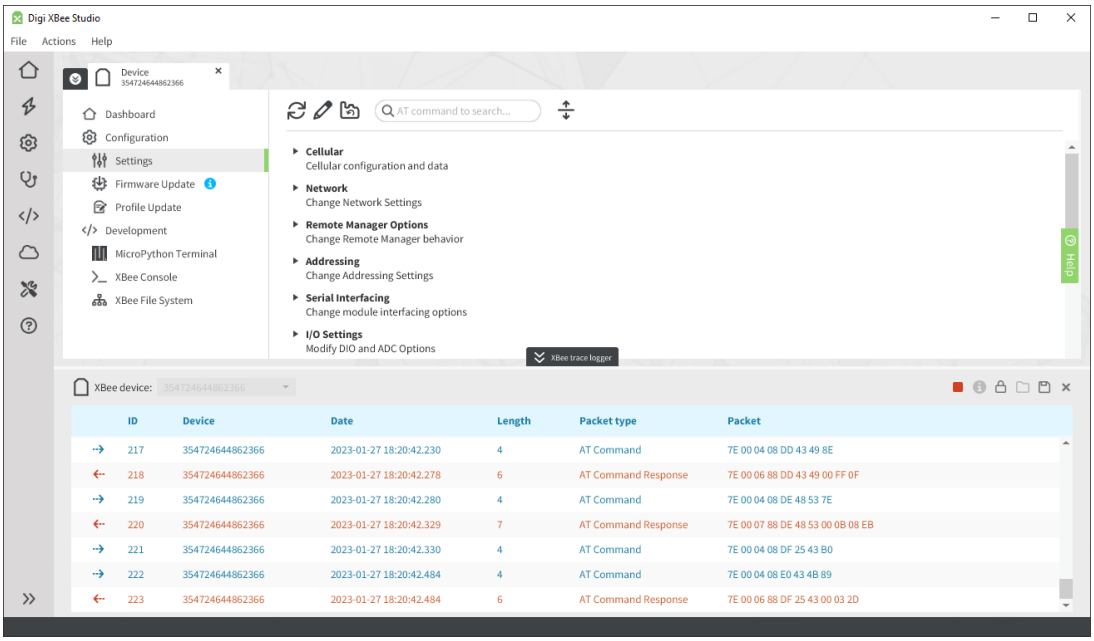

Note This tool only works with XBee devices in API or API escaped mode. If your device is configured in a different mode, the XBee trace logger will not capture and show any packet.

Start XBee packets capture

To start capturing XBee packets of an XBee device, follow these steps:

1. Click the **XBee trace logger** button located at the bottom of the application to expand the tool.
2. Select the XBee device you want to capture packets from in the left selector. If you want to capture packets from all XBee devices, select All devices.
3. Click the **Start XBee packets capture** button .

Inspect the XBee packets

Once the trace logger captures some packets of the selected XBee device, you can inspect them to get detailed information:

1. Select the packet you want to inspect.
2. Click the **Show detailed information of the selected packet** button .

The packet details dialog opens showing the different parts of the API packet.

Stop XBee packets capture

To stop capturing XBee packets, click the **Stop XBee packets capture** button .

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Development

This section allows you to create and automate standalone applications that make your XBee a smart device, communicate with it using API frames or create and edit XBee profiles to deploy them in production environments.

The available operations in this category are:

- Python and MicroPython
- XBee console
- File System
- Profile Editor
- API Frames

Python and MicroPython

This section allows you to communicate with the MicroPython REPL of your XBee device and learn how to create MicroPython and Python applications that can collect data, process it and transmit or save it anywhere.

The available operations in this category are:

- MicroPython Terminal
- PyCharm IDE Plugin

Profile Editor

This page allows you to create new XBee profiles or load and edit existing ones.

Note An **XBee profile** is a snapshot of a specific radio firmware configuration, including firmware, setting values, file system and other configuration information. Profiles can be used later in XBee Studio or other Digi RF applications.

Create a new profile

This action allows you to create a new XBee profile from scratch following a guided wizard:

1. **Description**.

   Enter a description of the profile or any note related to it–optional.
2. **XBee firmware**.
   a. Select the **XBee product** and **Firmware version** the profile targets to.
   b. Select whether the profile should **Flash radio firmware** in the XBee device or not. If you check this option, you can choose one of the following flash options:
      i. **Flash if firmware is different**. Firmware is flashed in the device only if the firmware version that the device is running is different from the one specified in the profile.
      ii. **Flash always**. Firmware is always flashed regardless of the version running on the device.
   c. If the selected product is an XBee Cellular and the firmware version supports updating the modem component, select whether the profile has to **Attach Cellular modem**

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firmware or not. Note that if you do not attach it, other Digi RF applications will not be able to update the Cellular modem component in case it is needed.

3. **Firmware settings**.
   a. Choose and enter the value of the firmware settings you want to configure with the profile. Note that read-only settings cannot be added to the profile.
   b. Select whether the profile should **Reset module to factory defaults before applying settings** or not. This is useful if you want to make sure the device does not have any previous configuration.
4. **File system**.
   a. Select whether the profile should **Format existing file system** or not. This is useful if you want to make sure the device does not have any previous file system when flashing the new one.
   b. Select whether the profile should **Format a new file system** or not. If you check this option, you have to select the folder that contains the file system to flash by clicking the **Browse...** button. After that, you will see the file system contents in the control below.
5. **Custom scripts**.

   Select whether the profile should **Use custom scripts for XBee Multi Programmer** or not. This feature allows you to run a script/program before and/or after applying a profile to the target device using XBee Multi Programmer.

   This section is divided into two sections, one for the pre-processing script, and the other for the post-processing script. Depending on the script you want to run, or both, fill in the appropriate information on each section respectively. Each section contains fields to indicate:

   a. **Script command**. The command to execute. Use whatever scripting language you want, but make sure it can be used by the machine that applies the profile. For example, if the command to run is: **pyhton set_node_id.py**, it is mandatory that the correct Python interpreter is installed and accessible in the machine that applies the profile.
   b. **Script timeout**. This is the maximum time XBee Multi Programmer should wait for the script to finalize its execution. When this time has passed, if the script has not finished, XBee Multi Programmer will assume your program got locked, and will stop the execution of the script returning a Timeout Exception. This parameter is specified in seconds, and its valid range of values goes from 1 to 36000 seconds (10 hours).
   c. **Script folder** (optional). This is a directory containing the script to be run and all of the resources it might need during its execution. It is not mandatory to attach any script to the profile, as long as it is accessible by the machine that applies the profile. To indicate the script/program to run, use one of the following:
      i. Attach the folder that contains the script to the profile. To do so, click the **Browse** button of the corresponding section. Select the complete folder that contains your script—this will be the execution path. It does not matter the number of files the script requires in order to run, as long as they are all included in the selected folder. If external resources are required by the script, make sure they are properly handled within your script, or include them in the same folder as your script so they are attached to the profile.
      ii. Use absolute paths to call a script that already exists in the machine that will apply the profile. The first field of each section—the command—can be called using

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absolute paths. Bear in mind that such script needs to handle all paths in an absolute manner, as well. In this case, the execution path will be the path where the XBee Multi Programmer was installed.

Load a profile

This action allows you to load an existing XBee profile in order to inspect and/or modify it:

1. Select the XBee profile to load from your computer (.xpro extension) and click **Open**.
2. The **Profile editor** loads the profile information and displays it along the different tabs of the view:
   a. **Description**. Contains the configured profile description.
   b. **XBee firmware**. Displays the XBee product and firmware version of the firmware corresponding to the profile.
   c. **Firmware settings**. Contains the list of firmware settings configured for the profile.
   d. **File system**. If the profile contains a file system, this tab displays its structure.
   e. **Custom scripts**. If the profile contains pre or post scripts, this tab displays their commands, timeout and structure for each one.

You can modify any aspect of the XBee profile and save it by clicking the **Save** button, which has two options:

- **Save profile**. Overwrites the loaded profile.
- **Save as new profile...**. Allows you to save a new profile with the changes made without modifying the loaded profile.

API Frames

This page allows you to encode (generate) and decode (interpret) any type of API frame and inspect it in detail.

The tool is split into two panes:

- **Frame input pane**. This pane is located at the left side of the tab and allows you to switch between encoding and decoding an API frame by entering the corresponding parameters for each case.
- **Frame details pane**. It is located on the right side of the tab and contains detailed information of the encoded or decoded frame.

Encode an API frame

To encode or generate an API frame you must select the **Encode API frame** tab from the Frame input pane. The contents of the pane change displaying all the parameters required to encode an API frame. These are:

Field	Description
Protocol	Radio protocol of the frame to be encoded. Select **All** to display all protocols.
Mode	API mode (API or API escaped) of the frame to encode.

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Field	Description
Frame type	API frame type of the frame to encode.
Frame parameters	Options depend on the selected **Frame type**. Hover over the information icon next to each setting to view a short description of the setting and its parameters.
Generated frame	Byte array result of API frame generation. You can select and copy the text.

Fill in all the fields to encode your API frame. Once the frame is generated successfully, the **Frame details** pane displays a detailed summary of the encoded frame.

Decode an API frame

To decode or interpret an API frame you must select the **Decode API frame** tab from the Frame input pane. The contents of the pane change displaying all the parameters required to decode an API frame. These are:

Field	Description
Mode	API mode (API or API escaped) of the frame to decode.
XBee API frame raw data	Byte array of the API frame to decode. The value of each byte must be hexadecimal without the **0x** prefix.

Fill in all the fields to decode your API frame. Once the frame is interpreted successfully, the **Frame details** pane displays a detailed summary of the decoded frame.

Remote Manager

This section allows you to add your Digi Remote Manager accounts in order to configure, communicate and update your XBee Cellular devices remotely as well as view and manage device data.

Add a Digi Remote Manager account

1. Click **Manage Accounts**.
2. Enter the username and password of your account.
3. Click **Add**. If the credentials are valid, your account is added to the right list.

Remove a Digi Remote Manager account

1. Click **Manage Accounts**.
2. Select the account you want to remove in the right list.
3. Click the **Remove** (X) button.

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Utilities

This section allows you to use other utilities of XBee Studio, read the documentation to learn how to use the tool, get the latest features and tell us how and what to improve!

The available operations in this category are:

- Firmware Explorer
- XBee Multi Programmer
- Docs & help
- Application Update
- Provide feedback

Firmware Explorer

This page allows you to navigate through XBee Studio's firmware library to review available firmware versions, their release notes and their settings without having a device attached to your computer.

Inspect a firmware version

Follow these steps to inspect a firmware version:

1. Select the XBee product and the desired firmware version.
2. You can inspect available settings for the selected firmware version.

Application Update

XBee Studio allows you to automatically update the application without downloading any extra files. This process can be configured to execute automatically, but you can also execute it manually at any time.

If you have enabled the automatic updates, you may be notified about software updates when you open XBee Studio. You should always run the latest version of the tool.

1. When a new version is available, a notification bar appears asking you if you want to update the application.
2. Click **Yes** to start the update process.
3. When the installation process is finished, you must restart XBee Studio so new changes can be applied. When prompted, click **Yes** to restart the tool.

You can also check for updates and manually update the tool by clicking **Help > Check for updates**.

Note Click the **Run in background** button of the progress dialog to execute this process in the background. The status bar displays the update process.

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XCTU Migration Guide

This section explains the main differences between XBee Studio and its predecessor, XCTU. Each of the following sections corresponds to a main workflow in XCTU and explains the equivalent workflow in XBee Studio.

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Add an XBee device

The first big difference between XCTU and XBee Studioo is how XBee devices are discovered and added to the tool. While in XCTU you have to manually discover devices by specifying a set of serial port configurations, XBee Studio automatically discovers all your XBee devices connected to the computer when it starts or whenever the device browser area is displayed or whenever a device is plugged or unplugged from the PC.

Discovered devices are also displayed in a different way. XCTU shows them on the left **Radio Modules** list, while XBee Studio simplifies the process by including a device browser and allowing you to display the devices in different views: graphical and table.

XBee Studio also allows you to work with XBee devices connected to your Digi Remote Manager account and located anywhere the same way as if they were physically connected to your computer.

Note For more information about the device browser, see Device browser.

XCTU	XBee Studio
1. Click **Add Radio Module** or **Discover Radio Module**. 2. Select one or multiple serial ports and optionally a serial port configuration. 3. Click **Finish**. After a few seconds, the discovered devices are displayed in the left **Radio Modules** list.	XBee devices connected to your computer are automatically discovered and displayed in the device browser.

Configure an XBee device (Settings)

In XCTU, once you add or discover an XBee device you have to click it in order to inspect or modify its configuration, which is based on multiple AT settings organized in different categories. In this view, you can read and/or write one or multiple settings, set the default values, update the device firmware or apply a configuration profile.

On the other hand, XBee Studio has separate pages for settings, firmware update and profile update. To access the settings page from the device browser you can hover over your XBee device to display the quick access menu and then click the **Open Settings** button, or click your device and then click **Settings** in the left menu.

Note For more information about the settings, see Settings.

In addition to the settings page, XBee Studio includes several quick actions in the device dashboard that allow you to quickly perform frequent operations on your device in a more graphical way without having to know all the AT settings that take part in those operations.

Note For more information about the available quick actions, see Quick Actions.

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XCTU	XBee Studio
1. Add or discover your device. 2. Click on it while you are in the Configuration working mode.	1. Wait until XBee Studio discovers your device. 2. Open the device settings page—choose one of the following: a. Hover over your device and then click **Open Settings**. b. Click on your device and then click **Settings** in the left menu. c. Click **Configuration** in the sidebar, then click **Settings** and finally click on your device. 3. To access the quick actions from the device browser, click on the device and scroll down to the **Quick Actions** section.

Update an XBee device (Firmware and Profile Update)

Another difference between XCTU and XBee Studio is how to access the firmware update and profile update functionality. While XCTU has actions to update the device firmware or to apply an XBee profile in the Configuration working mode, XBee Studio separates these actions from the device settings view and moves them to different pages. In addition, XBee Studio simplifies both the firmware and XBee profile selection and shows the update progress in a more graphical way.

Note For more information about the firmware and profile update, see Firmware update and Profile update respectively.

Firmware Update:

XCTU	XBee Studio
1. Add or discover your device. 2. Click on it while you are in the Configuration working mode. 3. Click the **Update firmware** button in the toolbar, select the product family/function set/firmware version and click **Update**.	1. Wait until XBee Studio discovers your device. 2. Open the firmware update page – choose one of the following: a. Hover over your device and then click **Open Firmware Update**. b. Click on your device and then click **Firmware Update** in the left menu. c. Click **Configuration** in the sidebar, then click **Firmware Update** and finally click on your device.

Profile Update:

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XCTU	XBee Studio
1. Add or discover your device. 2. Click on it while you are in the Configuration working mode. 3. Click the **Update firmware** button in the toolbar, select the product family/function set/firmware version and click **Update**.	1. Wait until XBee Studio discovers your device. 2. Open the firmware update page – choose one of the following: a. Hover over your device and then click O**pen Profile Update**. b. Click **Configuration** in the sidebar, then click **Profile Update** and finally click on your device.

Communicate with an XBee device (Console)

Depending on the operating mode of your XBee device, XCTU either shows an AT console, where the communication with the device is direct, or an API console, where API frames are used instead.

XBee Studio, however, combines both consoles into one and allows you to send raw data and API frames to your device when it is configured in API operating mode. When it is in AT mode, you can directly write data in the console log as in XCTU.

The way to create raw packets or API frames is very similar. You need first to expand the **Send data** panel and then add a new data packet. If the device is in API, it allows you to create an API frame or enter raw data in ASCII or hexadecimal format; if it is in AT, it only allows you to enter raw data.

Note For more information about the console, see XBee console.

XCTU	XBee Studio
1. Add or discover your device. 2. Click the **Consoles working mode** button.	1. Wait until XBee Studio discovers your device. 2. Open the firmware update page –choose one of the following: a. Hover over your device and then click **Open XBee Console**. b. Click on your device and then click **XBee Console** in the left menu. c. Click **Development** in the sidebar, then click **XBee Console** and finally click on your device.

View the network of an XBee device (network)

Regarding the network, there are also some minor differences between XCTU and XBee Studio. While XCTU has a separate working mode for the network, XBee Studio integrates it within the device actions. As in XCTU, there are also two visualization modes: graphic and table, with several improvements in both of them.

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Note For more information about the network, see Network Topology.

XCTU	XBee Studio
1. Add or discover your device. 2. Click the **Network working mode** button. 3. Click the **Scan** button.	1. Wait until XBee Studio discovers your device. 2. Open the Network Topology page – choose one of the following: ▪ Click the blue network icon connected to your device. ▪ Click on your device and then click **Network Topology** in the left menu. ▪ Click **Network** in the sidebar, then click **Visualize Network**, and finally click on your device.

Use other tools

XCTU has several tools that offer different functionality related to XBee devices and their behavior. They are all located under the **Tools** menu and can be executed at any time. Some of them require you to select an XBee device.

XBee Studio offers the same tools but organized in a different way. Those that require a device, like the MicroPython Terminal or the XBee File System, can be found in the device menu. The rest are located in the **Diagnostics**, **Development** and **Utilities** categories of the sidebar.

Note that XBee Studio only allows you to use those tools that are compatible with XBee 3 Cellular devices. The rest will be added in future versions when XBee 3 RF devices are supported.

Note For more information about the tools, see API Frames, XBee recovery, Firmware Explorer, MicroPython Terminal, XBee File System or Profile Editor.

	XCTU	XBee Studio
Frames Generator and Frames Interpreter	1. Click **Tools** and then **Frames Generator** or **Frames Interpreter**.	1. Click **Development** in the sidebar and then **API Frames**.
XBee Recovery	1. Click **Tools** and then **XBee Recovery**.	1. Click **Diagnostics** in the sidebar and then **XBee Recovery**.
Firmware Explorer	1. Click **Tools** and then **Firmware Explorer**.	1. Click **Utilities** in the sidebar and then **Firmware Explorer**.
MicroPython Terminal	1. Click **Tools** and then **MicroPython Terminal**.	1. Wait until XBee Studio discovers your device. 2. Click on it and then click **MicroPython**

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	XCTU	XBee Studio
	2. Click **Open** and select the serial port of your device. Note Note that the device must be configured in MicroPython mode.	**Terminal** in the left menu. or Click **Development** in the sidebar, then click **Python & MicroPython**, then click **MicroPython Terminal** and finally click on your device. 3. Click **Open**.
File System Manager	1. Click **Tools** and then **File System Manager**. 2. Click **Open** and select the serial port of your device.	1. Wait until XBee Studio discovers your device. 2. Open the **File system manager** page – choose one of the following: a. Hover over your device and then click **Open XBee File System**. b. Click on your device and then click **XBee File System** in the left menu. c. Click **Development** in the sidebar, then click **XBee File System** and finally click on your device.
Profile Editor	1. Click **Tools** and then **Profile Editor**.	1. Click **Development** in the sidebar and then **Profile Editor**.

In addition to these, XBee Studio includes a new tool called **Quick Setup** to deploy pre-defined setups into one or several XBee devices in a quick and easy way. These setups can go from getting started processes or simple configurations that demonstrate different features of XBee devices, to more elaborated demos that include MicroPython applications and other components to form a complete system.

Note For more information about the Quick Setup, see Quick setup.

What's new and what changes from XCTU

- XBee Studio automatically discovers your XBee devices, so you don't have to look for or manually add them to the tool.
- XBee Studio allows you to work the same way with local XBee devices, those that are directly connected to your computer, and with cloud XBee devices, those that are in your Digi Remote Manager account. In addition, you can work with several devices at the same time, for example, updating the firmware of two devices in parallel.
- XBee Studio introduces a brand new tool called Quick Setup to deploy pre-defined setups into one or several XBee devices in a quick and easy way.

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- While XCTU is settings-oriented, XBee Studio puts the focus on the XBee device and simplifies its configuration through the Quick Actions, so you don't need to know which specific settings you have to change to modify the XBee behavior.
- XBee Studio combines the AT and API consoles in one, so you can enter in command mode regardless of the operating mode of your XBee device.
- XBee Studio only supports XBee 3 Cellular devices for now. The XBee 3 RF family will be supported in upcoming versions.

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