XBee® Gateway

User Guide

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Revision history—90001399-13

Revision	Date	Description
C	June 2017	■ Rebranded the graphics. ■ Added Digi ESP for Python installation instructions. ■ Modified regulatory and certification information as required by RED (Radio Equipment Directive).
D	July 2017	Updated the Certificate Management section to specify that this feature is available only for Wi-Fi devices.
E	September 2017	Reorganized and edited the document.
F	January 2020	Added information about the unique password for the web interface.
G	February 2020	Added link to data sheet specifications.

Trademarks and copyright

Digi, Digi International, and the Digi logo are trademarks or registered trademarks in the United States and other countries worldwide. All other trademarks mentioned in this document are the property of their respective owners.

© 2020 Digi International Inc. All rights reserved.

Disclaimers

Information in this document is subject to change without notice and does not represent a commitment on the part of Digi International. Digi provides this document “as is,” without warranty of any kind, expressed or implied, including, but not limited to, the implied warranties of fitness or merchantability for a particular purpose. Digi may make improvements and/or changes in this manual or in the product(s) and/or the program(s) described in this manual at any time.

Warranty

To view product warranty information, go to the following website:

www.digi.com/howtobuy/terms

Send comments

Documentation feedback: To provide feedback on this document, send your comments to techcomm@digi.com.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Customer support

Digi Technical Support: Digi offers multiple technical support plans and service packages to help our customers get the most out of their Digi product. For information on Technical Support plans and pricing, contact us at +1 952.912.3444 or visit us at www.digi.com/support.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Contents

About Digi XBee Gateway

Regulatory information and certifications 10
RF exposure statement 10
FCC certifications and regulatory information (USA only) 10
Declaration of Conformity (DoC) 11
CE mark (Europe) 11
Industry Canada (IC) certifications 12
Korea Communications Commission (KCC) certifications 12
Safety statements 12
Warnings for Use of Wireless Devices 13
International EMC (Electromagnetic Emissions/Immunity/Safety) standards 14
Maximum power and frequency bands 14
XBee Gateway: Cellular 15
XBee Gateway: Ethernet 15
XBee Gateway: Wi-Fi 15
XBee Gateway Python application 15
XBee ZigBee Cloud Kit 15
Hardware interfaces 16
Configuration and management interfaces 16
XBee Gateway web interface 16
Remote Manager interface 16
RF Gateway and Python remote device management solutions 17
Programming interface applications 17
Product differences from predecessor ConnectPort® X products 18
Where to find more information 19

Get started

Set up the XBee Gateway Cellular hardware 20
Verify your components 20
Connect the cellular hardware 22
Connect XBee Gateway to the network 23
Set up the XBee Gateway Wi-Fi hardware 23
Verify your components 24
Connect the Wi-Fi hardware 25
Connect XBee Gateway to the network 26

Set up your XBee Gateway

Set up XBee Gateway summary 28

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Joining ZigBee networks 29
Join XBee Gateway to an existing ZigBee network 30
Configure XBee Gateway with a custom PAN ID 31
XBee Gateway and non-XBee ZigBee Devices 32

Administration and maintenance tasks

Logging in to the web interface 33
File management 33
File Management page in Remote Manager 33
File Management page in the XBee Gateway web interface 34
Certificate Management 35
Certificate Management page in the web interface 35
Back up or restore the configuration 36
Back up and restore files from Remote Manager 36
Back up and restore files from the XBee Gateway web interface 37
Update firmware 38
Update firmware from Remote Manager 38
Update firmware from the XBee Gateway web interface 40
About firmware files 41
Mobile device status 41
Display the mobile device status 42
Mobile Status page 42
Change the password for the web interface 50
Display the XBee Gateway End User License Agreement (EULA) 52
Restore XBee Gateway factory defaults 53
Reboot XBee Gateway 53
Display system information 53
Disconnect XBee Gateway from Remote Manager 53

About programming

Python 54
XBee ZigBee Cloud Kit web application source code 55
Programming calls through Server Command Interface (SCI) and Remote Command Interface (RCI) 55
XBee Gateway file system 55
Important directories 55
Load applications onto XBee Gateway 56

Program XBee Gateway using Python

Find Python learning resources 58
Python support forum 58
Digi Python Wiki Archive Reference Manual 58
Digi-specific Python modules for programming 58
Sample programs 58
Button handling 59
LED control 59
Watchdog 60
RCI callback 61
XBee functions 62
XBee Gateway Python application and Remote Manager 62

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

How does the XBee Gateway Python application work? 62
XBee Gateway Python application requirements 63
Key features and operations of the XBee Gateway Python application 64
Store status data for XBee lines in Remote Manager 64
Receive serial data from Remote Manager 68
Store serial data in Remote Manager 75
Manage XBee DIO lines though Remote Manager 78
XBee Gateway Python application configuration file 85
XBee Gateway Python application command errors 86
Configure a Python application in the web interface 86
Digi ESP for Python 87
Access the program samples in Digi ESP 87
Install the Digi ESP for Python Development Environment 88
DIA software 91
Linux command shell (command line interface) 91
User name and password for the Linux command shell 91
Connect and log in to the XBee Gateway device 91
Log in to XBee Gateway through the Digi ESP for Python command line interface 92

Configure XBee Gateway

Configure settings from Remote Manager 95
Basic configuration settings 95
Advanced configuration settings 95
Configure settings from the XBee Gateway web interface 96
Access the XBee Gateway web interface 96
Home page 97
Ethernet IP network settings 98
Default Ethernet settings 98
Configure Ethernet Settings 99
Ethernet Network Configuration page 99
Wireless (Wi-Fi) network settings 101
Default wireless (Wi-Fi) settings 101
Configure wireless settings 101
Wi-Fi network settings 101
Mobile connectivity settings 104
Default behavior with the cellular network 104
Set up and configure GSM-based devices 105
Provision a CDMA-based device 106
Configure mobile settings 107
Mobile Connectivity Configuration page 108
Short Message Service (SMS) 109
Digi Mobile SureLink™ settings 112
Configure Mobile SureLink settings 112
Mobile SureLink integrity monitoring settings 112
Link integrity test options 114
DNS settings 115
Configure Domain Name Server (DNS) 115
Domain Name Server (DNS) Configuration page 115
Mobile firewall settings 116
Configure mobile firewall settings 116
Enable or Disable Mobile firewall settings 116
Autostart settings for the Python Program 116
Configure Python settings 117
Python settings 117

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Button service assignments settings 117
Configure button service assignments 117
Button service assignments page 118
Restore XBee Gateway factory defaults 118
Use discovery tools to enable configuration changes 118
Use the button to enable special-purpose Wi-Fi configuration mode 119
Use the button to enable the web interface 120
Configure Remote Manager connectivity settings 120
Configure connectivity settings 121
Basic connectivity settings 121
Advanced connectivity settings 122
Advanced connectivity settings for the web interface 124
Device Cloud client initiated connection page 127
Device Cloud Configuration page 128
Device Cloud network type page 129
Connect to a different instance of Remote Manager 130
Configure a proxy server 130
Network services settings 131
Configure network services settings 131
Network Services Configuration page 131
GPS static position settings 133
Configure GPS Static Position settings 133
GPS Static Position page 134
Time settings 134
Configure time settings 134
Time Server Configuration page 135
Time Zone Configuration page 135
Time Configuration page 135

Configure XBee network settings

Configure XBee Networks page in Remote Manager 137
Configure XBee network settings in the web interface 138
XBee Configuration page 138
Device Details page 139
XBee network OTA firmware updates 141
Update the XBee network node firmware (OTA updates) from Remote Manager 141
Update the XBee node firmware (OTA updates) from the web interface 142
XBee Gateway network Python log file 144
XBee network troubleshooting resources 144

Learn more about XBee Gateway

Default startup and operation behaviors for XBee Gateway 145
Default behavior regarding NTP time server access 145
Default behavior regarding DNS 145
Firewalls and required open ports 146
Deploying devices over a network 146
Connect the XBee nodes to XBee Gateway 146
Configure XBee Gateway as a coordinator 146
Join nodes to the coordinator 147
Verify that XBee nodes are joined to the coordinator 148
Configure the ZigBee network addressing parameters for XBee nodes 149
Key addressing parameters 149

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Configure the network addressing parameters 150
Explore serial I/O 150
Understand the process for configuring the serial I/O 150
Example serial I/O configuration 151
Configure the serial I/O 151
Explore digital and analog I/O 152
Understand the process for digital and analog I/O 152
Example digital or analog I/O configuration 153
Configure the digital or analog I/O 154
View your device data 156
View device data from Remote Manager 157
View device data and events in the Python log file for XBee Gateway 157

Hardware

Ethernet and Wi-Fi hardware 162
Cellular hardware 163
Antennas 164
XBee Gateway button 164
XBee Gateway LEDs descriptions 165
Power LED 165
XBee LED 166
Network LED 166
Signal strength LED (cellular models only) 167

Troubleshoot your XBee Gateway

XBee Gateway system log 169
XBee Gateway log files and contents 169
Display the system log 170
Cellular connection issues 171
Common provisioning issues 171
Troubleshooting XBee Gateway GSM devices 172
Troubleshooting XBee Gateway CDMA devices 173
Device Discovery troubleshooting tips 173
Rebooting XBee Gateway 174
Troubleshooting LEDs 174
Firewalls and required open ports 175
Cannot connect to NTP time server to get correct time 176
Cannot connect to DNS server to resolve the Remote Manager server address 176
Need more help? 176

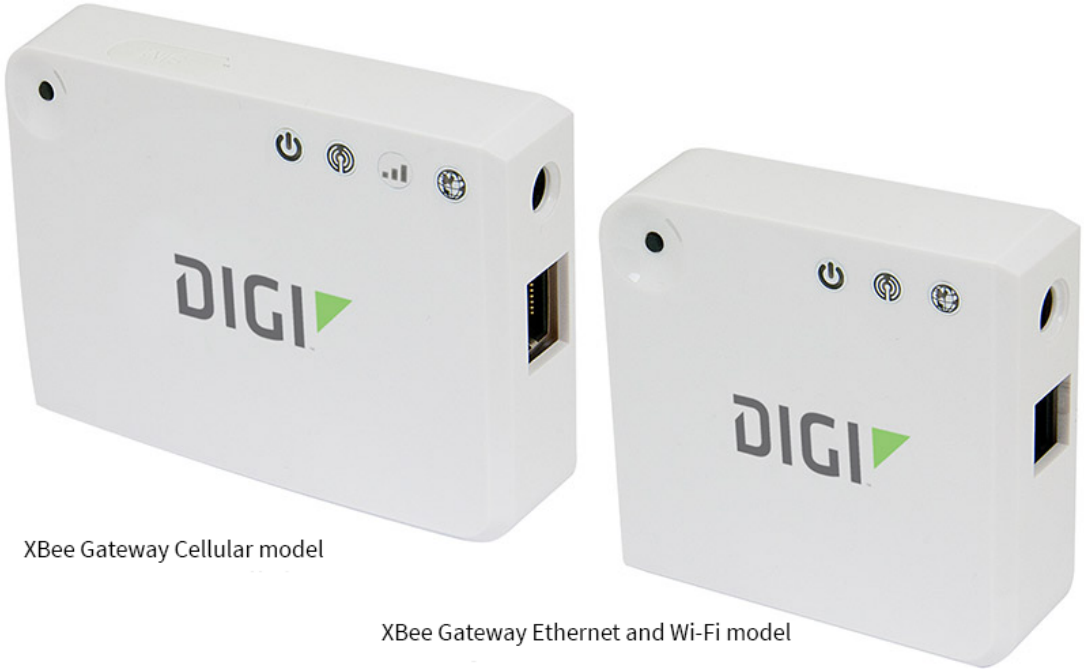
원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

About Digi XBee Gateway

Digi XBee® Gateway provides a low-cost, programmable solution to connect networks of XBee-enabled devices to IP networks. With a simple, open-source Python™ development environment, this gateway enables custom applications to run locally while interfacing across existing Ethernet/Wi-Fi/cellular networks for WAN connectivity to cloud-based software applications.

The XBee Gateway contains the XBee ZigBee product.

You can manage XBee Gateway products remotely via Digi Remote Manager®. Remote Manager allows users to remotely manage thousands of deployed devices, supporting features like remote firmware upgrades and event alarms.



XBee Gateway Cellular model

XBee Gateway Ethernet and Wi-Fi model

This guide describes how to get started with your XBee Gateway. This guide is intended for a developer or programmer. It covers the following information:

- Hardware
- Get started
- Set up your XBee Gateway

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

- Administration and maintenance tasks
- About programming
- Program XBee Gateway using Python
- Configure XBee Gateway
- Configure XBee network settings
- Learn more about XBee Gateway
- Troubleshoot your XBee Gateway

Regulatory information and certifications

RF exposure statement

In order to comply with RF exposure limits established in the ANSI C95.1 standards, the distance between the antenna or antennas and the user should not be less than 20 cm.

FCC certifications and regulatory information (USA only)

FCC Part 15 Class B

Radio Frequency Interface (RFI) (FCC 15.105)

This device has been tested and found to comply with the limits for Class B digital devices pursuant to Part 15 Subpart B, of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Labeling Requirements (FCC 15.19)

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

If the FCC ID is not visible when installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module FCC ID.

Modifications (FCC 15.21)

Changes or modifications to this equipment not expressly approved by Digi may void the user's authority to operate this equipment.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 10 / 177

Declaration of Conformity (DoC)

Digi has issued Declarations of Conformity for the XBee Gateway concerning emissions, EMC, and safety. For more information, see www.digi.com/resources/certifications.

Important note

Digi customers assume full responsibility for learning and meeting the required guidelines for each country in their distribution market. Refer to the radio regulatory agency in the desired countries of operation for more information.

CE mark (Europe)

The XBee Gateway is certified for use in several European countries. For information, visit www.digi.com/resources/certifications.

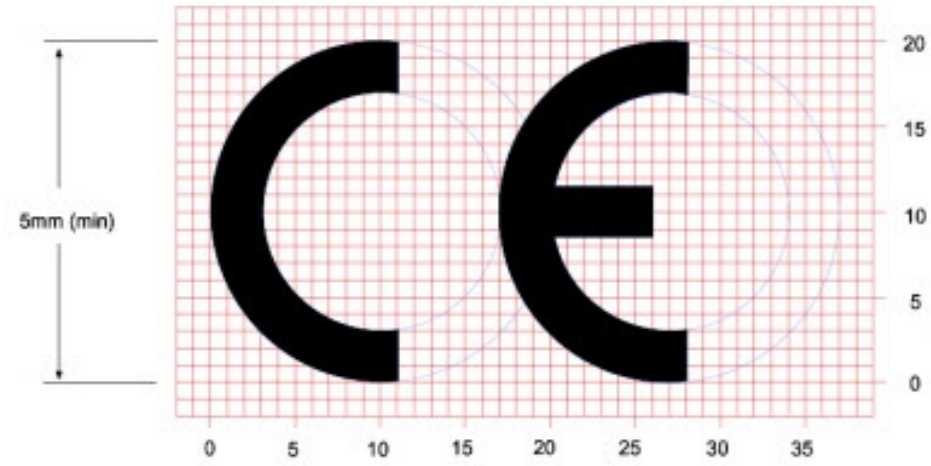
If the XBee Gateway is incorporated into a product, the manufacturer must ensure compliance of the final product with articles 3.1a and 3.1b of the RE Directive (Radio Equipment Directive). A Declaration of Conformity must be issued for each of these standards and kept on file as described in the RE Directive.

Furthermore, the manufacturer must maintain a copy of the XBee Gateway user manual documentation and ensure the final product does not exceed the specified power ratings, antenna specifications, and/or installation requirements as specified in the user manual. If any of these specifications are exceeded in the final product, a submission must be made to a notified body for compliance testing to all required standards.

OEM labeling requirements

The CE marking must be affixed to a visible location on the OEM product.

CE labeling requirements



The CE mark shall consist of the initials “CE” taking the following form:

- If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

- The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.
- The CE marking must be affixed visibly, legibly, and indelibly.

Industry Canada (IC) certifications

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class B prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Korea Communications Commission (KCC) certifications

We, Digi International, in agreement with Powermat gateway, as per The Radio Research Agency (RRA), division of the Korea Communications Commission (KCC), consider this device Industrial Class A Equipment (Industrial Broadcasting & Communication Equipment) and therefore electromagnetic wave-suitable.

For Class A Equipment (Business Broadcasting and Communications Equipment)

이 기기는 업무용(A 급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시길 바라며 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

The equipment is for business use (Class A), and has acquired electromagnetic conformity registration, so sellers and users are required to take caution in this regard.

Safety statements

Important Safety Information

CAUTION! To avoid contact with electrical current, follow all safety items listed below.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- Never install electrical wiring during an electrical storm.
- Never install an Ethernet connection in wet locations unless that connector is specifically designed for wet locations.
- Use caution when installing or modifying lines.
- Use a screwdriver and other tools with insulated handles.
- Wear safety glasses or goggles.
- Do not place Ethernet wiring or connections in any conduit, outlet or junction box containing electrical wiring.
- Installation of inside wire may bring you close to electrical wire, conduit, terminals and other electrical facilities. Extreme caution must be used to avoid electrical shock from such facilities. Avoid contact with all such facilities.
- Ethernet wiring must be at least 6 feet from bare power wiring or lightning rods and associated wires, and at least 6 inches from other wire (antenna wires, doorbell wires, wires from transformers to neon signs), steam or hot water pipes, and heating ducts.
- Do not place an Ethernet connection where it would allow a person to use an Ethernet device while in a bathtub, shower, swimming pool, or similar hazardous location.
- Protectors and grounding wire placed by the service provider must not be connected to, removed, or modified by the customer.
- Do not touch uninsulated Ethernet wiring if lightning is likely.
- External Wiring: Any external communications wiring installed needs to be constructed to all relevant electrical codes. In the United States this is the National Electrical Code Article 800. Contact a licensed electrician for details.

Warnings for Use of Wireless Devices

CAUTION! Observe all warning notices regarding use of wireless devices.

Potentially Hazardous Atmospheres

Observe restrictions on the use of radio devices in fuel depots, chemical plants, etc. and areas where the air contains chemicals or particles, such as grain, dust, or metal powders, and any other area where you would normally be advised to turn off your vehicle engine.

Safety in Aircraft

Switch off the wireless device when instructed to do so by airport or airline staff. If the device offers a ‘flight mode’ or similar feature, consult airline staff about its use in flight.

Safety in Hospitals

Wireless devices transmit radio frequency energy and may affect medical electrical equipment. Switch off wireless devices wherever requested to do so in hospitals, clinics, or health care facilities. These requests are designed to prevent possible interference with sensitive medical equipment.

Pacemakers

Pacemaker manufacturers recommended that a minimum of 15 cm (6 inches) be maintained between a handheld wireless device and a pacemaker to avoid potential interference with the pacemaker. These recommendations are consistent with independent research and recommendations by Wireless Technology Research.

Persons with Pacemakers

- Should ALWAYS keep the device more than 15 cm (6 inches) from their pacemaker when turned ON.
- Should not carry the device in a breast pocket.
- If you have any reason to suspect that the interference is taking place, turn OFF your device.

International EMC (Electromagnetic Emissions/Immunity/Safety) standards

This product complies with the requirements of following Electromagnetic Emissions/Immunity/Safety standards.

There are no user-serviceable parts inside the product. Contact your Digi representative for repair information.

Emissions	Immunity	Safety
AS/NZS 4268:2008 (Amended by A1:2010) Class B (Wi-Fi only) AS/NZS CISPR 22:2009 Class B EN 301 489-17 V2.1.1:2009 Class B (Wi-Fi only) EN 55022:2010 Class B EN 61000-3-2:2006 EN 61000-3-3:2008 FCC Part 15 Subpart B Class B FCC Part 15 Subpart C (Wi-Fi only) ICES-003:2004 Class B RSS-Gen:2010 (Wi-Fi only) RSS-210:2010 (Wi-Fi only)	EN 301 489-17 V2.1.1:2009 (Wi-Fi only) EN 55024:2010 EN 301 489-24 V1.5.1 (Cellular only)	IEC 60950-1:2005 EN 60950-1:2006 UL 60950-1 CSA C22.2 No. 60950-1

Maximum power and frequency bands

This section contains the maximum power and frequency bands for the XBee Gateway.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 14 / 177

XBee Gateway: Cellular

Maximum power	Associated frequencies
6.3 mW	5 MHz channel spacing, beginning at 2405 MHz and ending at 2480 MHz
2 W	Cellular 850 and 900 MHz bands
1 W	Cellular 1800 and 1900 MHz bands

XBee Gateway: Ethernet

Maximum power	Associated frequencies
6.3 mW	5 MHz channel spacing, beginning at 2405 MHz and ending at 2480 MHz

XBee Gateway: Wi-Fi

Maximum power	Associated frequencies
6.3 mW	5 MHz channel spacing, beginning at 2405 MHz and ending at 2480 MHz
88 mW	13 overlapping channels each 22 MHz wide and spaced at 5 MHz. Centered at 2.412 to 2.472 MHz.

XBee Gateway Python application

The XBee Gateway Python application resides on XBee Gateway. Its key functions include connecting your XBee modules to Remote Manager, enabling uploads of data to Remote Manager, and receiving remote text and commands. The XBee Gateway Python application is installed by default in your XBee Gateway device and automatically starts when the gateway is initialized.

For more information on the XBee Gateway Python application, see XBee Gateway Python application and Remote Manager.

XBee ZigBee Cloud Kit

Digi offers a development kit called the XBee ZigBee Cloud Kit.

The XBee ZigBee Cloud Kit is designed to make it easy to set up your XBee ZigBee hardware and configure its sample web application. You can see sensor data from your development board on the web, as well as send data and commands from the web to your device. The components in this kit allow you to create highly customized solutions for connected devices.

To order this kit, go to the XBee Gateway product page for ordering information. For setup instructions, see the *XBee ZigBee Cloud Kit Getting Started Guide*.

Hardware interfaces

XBee Gateway hardware interfaces include a button for controlling various device operations, LEDs that indicate device state and status of connections, and activity for Ethernet, Wi-Fi, cellular, and XBee network connections. You can control some of these hardware features through programming.

For detailed information about hardware interfaces, see Hardware.

Configuration and management interfaces

To establish network connectivity with an XBee Gateway device, minimal configuration is required in many environments. This means that you may not need to set or change configuration settings from their factory defaults to begin developing with the device. There are several user interfaces for interacting with XBee Gateway, for example to view or change configuration settings or perform important administrative tasks such as updating firmware or rebooting the device. These include:

- XBee Gateway web interface: A web-based interface for configuring, monitoring, and administering Digi devices.
- Remote Manager interface: A web-based, remote-management interface.
- RF Gateway and Python remote device management solutions
- Programming interface applications

XBee Gateway web interface

The XBee Gateway web interface, available via a local network connection to XBee Gateway, provides an easy way to configure device settings and perform administrative tasks. Device information displayed varies by model.

You are required to log in to the web interface. The default user name and password are described below:

- **User name**: **python**
- **Password**: The unique password printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.

For more information, see Configure settings from the XBee Gateway web interface.

Remote Manager interface

Remote Manager is a software-as-a-service that empowers IT, network operations and customer support organizations to conquer the challenges of managing the vast array of equipment in their device networks. As a network grows, the complexity of effectively managing the network assets grows exponentially.

When XBee Gateway powers up, the device automatically connects to Remote Manager. Remote Manager provides the capabilities you need to manage a dynamic device network, including:

- Centralized control over large numbers of devices
- Reducing service complexity
- Maintaining high levels of security

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 16 / 177

- Configuring and decommissioning of equipment
- Adding functionality to device networks

In addition, you can use the Remote Manager Web Services (API) to provide seamless integration from Digi gateways into customer back-office applications. You can access these Web Services via the **API Explorer** tab of the **Documentation** tab of the Remote Manager interface. See *Digi Remote Manager Programmer Guide* for more information.

Some things to note about using Remote Manager:

- You must register devices on Remote Manager before you can access them from Remote Manager.
- To minimize network traffic, Remote Manager uses caching. As a result, device settings can be out-of-sync between the device and the settings viewed on the Remote Manager console.
- You can refresh device information on demand when the device is connected. The device information refreshes automatically when a device connects.

For more information about configuring settings from Remote Manager, see Configure settings from Remote Manager.

For more information on Remote Manager as a remote device network management solution, see these resources:

- *Digi Remote Manager User Guide*
- *Digi Remote Manager Programmer Guide*
- Remote Manager tutorials and other documents available on the Digi Remote Manager product page

Note To serve our customers most effectively, Digi International Inc. is consolidating its cloud services, Digi Device Cloud and Digi Remote Manager®, under the Remote Manager name. This phased process does not affect device functionality or the functionality of the web services and other features. However, you will find instances of both Device Cloud and Digi Remote Manager in some documentation, firmware, and user interfaces.

RF Gateway and Python remote device management solutions

XBee Gateway includes Remote Manager functionality by default. This functionality allows you to see your data in the cloud quickly and with minimal effort.

However, you can extend the system through the Python interpreter and customize the gateway to connect directly to the environment of your choice. See the Digi XBee, RF Gateway and Python Resource page for more information.

Programming interface applications

XBee Gateway offers a variety of interfaces that produce and/or consume data. Developing software programs for XBee Gateway products allows Digi customers to provide custom logic to control the information to and from these interfaces.

For more information, see About programming.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 17 / 177

Product differences from predecessor ConnectPort® X products

XBee Gateway differs from predecessor ConnectPort X products. These differences are important to programmers and integrators who are familiar with the predecessor devices and need to develop applications and install or manage the gateway. These differences include the following.

- **Operating system**: XBee Gateway is built on the industry-standard Linux operating system, versus a Digi-proprietary embedded operating system.
- **Memory**: XBee Gateway has 64 MB of RAM and 128 MB of flash memory. Users have access to up to 20 MB of RAM and up to 20 MB of flash memory. Predecessor devices had less RAM and flash memory available for custom Python applications.
- **System date and time**: XBee Gateway, for reasons of improved security, has a greater dependence on time synchronization than predecessor products. In so doing, XBee Gateway uses standard Network Time Protocol (NTP) and requires connectivity with an external NTP time server. Without NTP, the device cannot:
  - Correctly validate security certificate
  - Disable the ability to connect to Remote Manager
  - Disable the ability to update the firmware
- **Button**: XBee Gateway features a programmable button. You can configure this button to activate some Digi native features (such as returning a device to its factory defaults), and you can also use this button for custom applications. For more information on the button, see XBee Gateway button. This button behavior differs from the **Reset** button behavior on other gateway products.
- **User interfaces**:
  - XBee Gateway has a web user interface for both network configuration and access to the log file for troubleshooting the initial connection to Remote Manager. For more information on the web interface, see Configure XBee Gateway.
  - **Command-line interface differences**: XBee Gateway allows access to the Linux shell using SSH. For more information about the shell, see Linux command shell (command line interface). Access to a command-line interface through Telnet is not supported for network security reasons. Commands in the command-line interface for predecessor ConnectPort X products are not supported. However, some ConnectPort X2 command-line interface commands have equivalents in the Remote Command Interface (RCI).
- **Firmware updates**: Due to the complexity of the Linux-based system, you cannot use standard firmware updates to downgrade a system.
- **Logging**: XBee Gateway supports continuous logging for troubleshooting. You can browse the log files from the web interface or pull the log files from the device file system in Remote Manager. They are stored in the Linux file system in the /WEB/logging directory and persist across reboots and power cycles. For more information, see View the Python log file.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 18 / 177

- **Supported Python version**: XBee Gateway uses Python interpreter version 2.7. Many predecessor ConnectPort X products use Python 2.4.

  Any custom-compiled Python code must be recompiled for Python interpreter 2.7. Custom Python modules are not 100% compatible with XBee Gateway. Therefore, in addition to recompiling, you may need to port.

Where to find more information

See the following topics in this guide for more information:

- Learn more about XBee Gateway
- About programming

The following documents are available on www.digi.com unless otherwise noted:

- For more information about features and operation of the XBee RF module mounted inside the gateway, see *XBee/XBee-PRO ZigBee RF Module User Guide*.
- You can refer to the ConnectPort X2e section in the *Digi Python Wiki Archive Reference Manual* for additional programming content for ConnectPort X2e products. Information in this section also applies to XBee Gateway.
- DIA section in the *Digi Python Reference Manual for Developers* guide
- *Digi Remote Manager User Guide*
- *Digi Remote Manager Programmer Guide*
- Datasheets and other documents on the Digi Remote Manager product page

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 19 / 177

Get started

Based on the XBee Gateway model that you have, choose one of the following options:

- Set up the XBee Gateway Cellular hardware
- Set up the XBee Gateway Wi-Fi hardware

Set up the XBee Gateway Cellular hardware

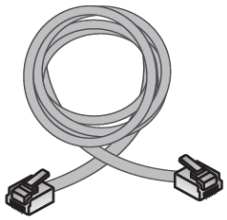
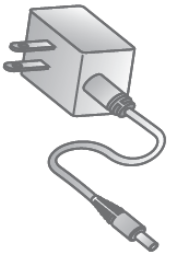
This section walks you through the steps required to set up your XBee Gateway Cellular hardware and provides additional reference information.

Verify your components

Included equipment

Equipment	Description
XBee Gateway (Cellular model)	

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

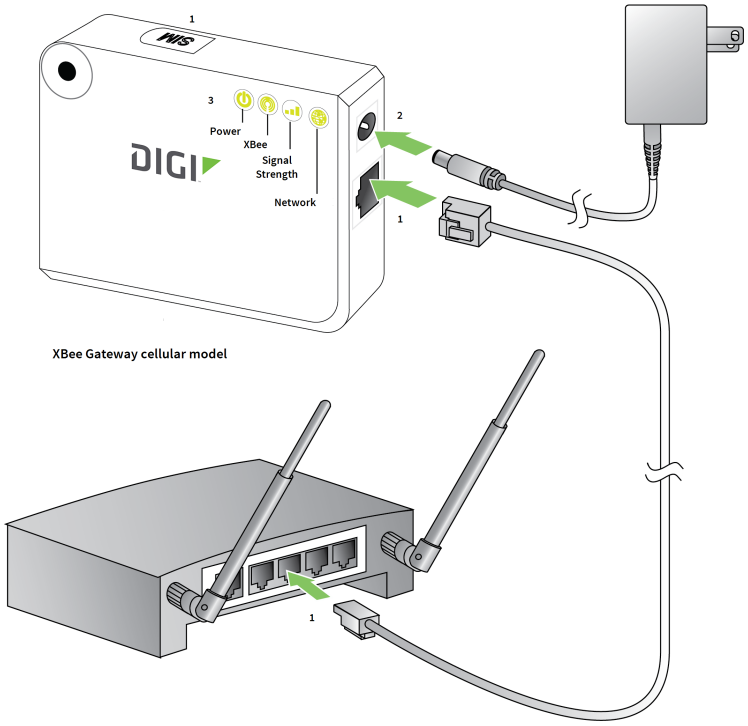
Equipment	Description
Ethernet cable	
Power supply	

Note A loose label sticker that includes the unique device password may be included in the box. Retain this label sticker with your hardware records. This default password will be needed to log into the device's web UI if the device is factory reset.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

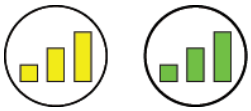
we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Connect the cellular hardware



1. Install a SIM card. See Set up and configure GSM-based devices for instructions.
2. Optional: If you are using an Ethernet connection in addition to the cellular, connect one end of the Ethernet cable to your gateway and the other to a live Ethernet jack.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

3. Connect the power supply.
4. **Startup Sequence** - After power is applied:
   a. The **Power** LED turns solid green.
   b. The **XBee** LED turns blinking green when XBee Gateway creates a ZigBee network.
   c. The **Network** LED gradually turns solid green when XBee Gateway connects to Remote Manager.
   d.  For the Cellular model, the **Signal Strength** LED turns either yellow or green, depending on the cellular signal strength.

Connect XBee Gateway to the network

Choose one of the following options:

Connect to an Ethernet network

Your XBee gateway automatically connects to the Ethernet network when a DHCP server is available to assign an IP address to it and no firewalls block outgoing traffic to ports **3197** and **3199**. If the Ethernet network does not come up, see Cannot connect to DNS server to resolve the Remote Manager server address.

Note XBee Gateway requires a DHCP server to assign its IP address. If you do not have a DHCP server, see Ethernet IP network settings for information on configuring your IP parameters.

Connect to a Cellular network

Register the modem in the XBee Gateway cellular device and set it up in your mobile service provider's network. Registration and setup differs among models. See Default behavior with the cellular network for information on configuring the XBee Gateway cellular model (GSM or CDMA). Disconnect the Ethernet cable when the configuration steps are complete.

Set up the XBee Gateway Wi-Fi hardware

This section walks you through the steps required to set up your XBee Gateway Wi-Fi hardware and provides additional reference information.

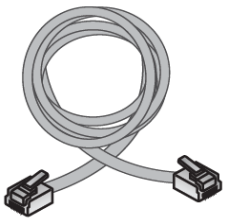
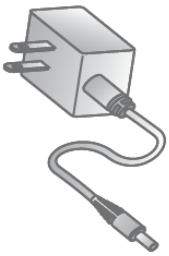
원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 23 / 177

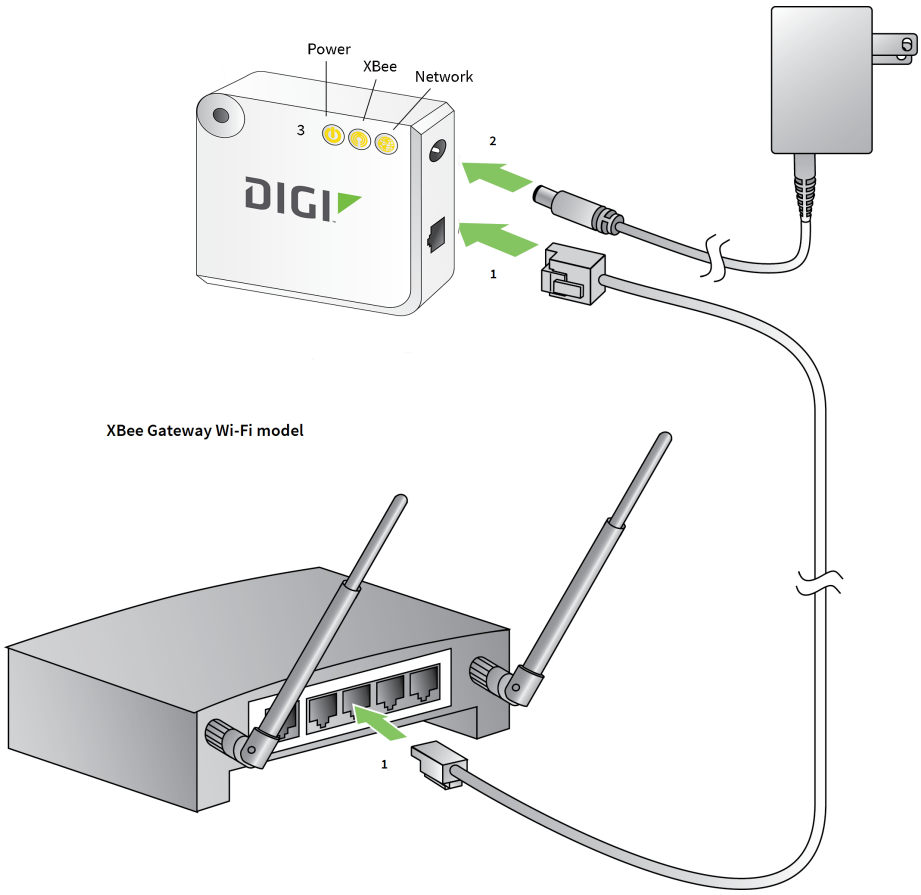
Verify your components

Included equipment

Equipment	Description
XBee Gateway (Wi-Fi model)	
Ethernet cable	
Power supply	

Note A loose label sticker that includes the unique device password may be included in the box. Retain this label sticker with your hardware records. This default password will be needed to log into the device's web UI if the device is factory reset.

Connect the Wi-Fi hardware



1. Optional: If using an Ethernet connection in addition to the Wi-Fi, connect one end of the Ethernet cable to your gateway and the other to a live Ethernet jack.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

2. Connect the power supply.
3. **Startup Sequence** - After power is applied:
   a. The **Power** LED turns solid green.

   b. The **XBee** LED turns blinking green when XBee Gateway creates a ZigBee network.

   c. The **Network** LED gradually turns solid green when XBee Gateway connects to Remote Manager.

Note For more information on these LED states, see XBee Gateway LEDs descriptions.

Connect XBee Gateway to the network

Choose one of the following options:

Connect to a Wi-Fi network

1. Get the following Wi-Fi security information from your network administrator. You will need this to connect to your Wi-Fi access point in step 6.

   SSID: _____

   Wi-Fi security mode: _____

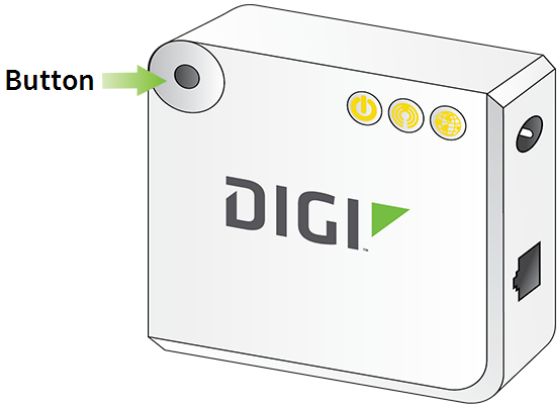
   Passphrase or key: _____

   Other parameters: _____

2. Press the button on your XBee Gateway once to enable Access Point mode. This Access Point mode is active for **five minutes**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025



3. From the list of Wi-Fi network connections on your computer, connect your computer to the Wi-Fi network named **xbgw-xx:xx:xx:xx:xx:xx**, where **xx:xx:xx:xx:xx:xx** is the serial number of the gateway.
4. Once you connect to the Wi-Fi network on your computer, open a web browser and type the URL of XBee Gateway: **http://192.168.100.1**. This will open the XBee Gateway web interface.
5. Log in to the web interface.
   - **User name**: The default user name is **python**. If that user name does not work, it may have been changed by your system administrator. Contact your system administrator for help.
   - **Password**: The unique, default password is printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.
6. From the XBee Gateway web interface, go to **Configuration > Wireless Network**.
7. On the Wireless Network Configuration page, click **Run Wizard** under **Interface Configuration** and follow the prompts to configure your device. See Wi-Fi network settings for more information.
8. Restore the Wi-Fi network on your computer to its previous connection.

Connect to an Ethernet network

Your XBee gateway automatically connects to the Ethernet network, when a DHCP server is available to assign an IP address to it and no firewalls block outgoing traffic to ports **3197** and **3199**. If the Ethernet network does not come up, see Cannot connect to DNS server to resolve the Remote Manager server address.

Note XBee Gateway requires a DHCP server to assign its IP address. If you do not have a DHCP server, see Ethernet IP network settings for information on configuring your IP parameters.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Set up your XBee Gateway

This section walks you through the steps required to set up your XBee Gateway and provides additional reference information.

Set up XBee Gateway summary

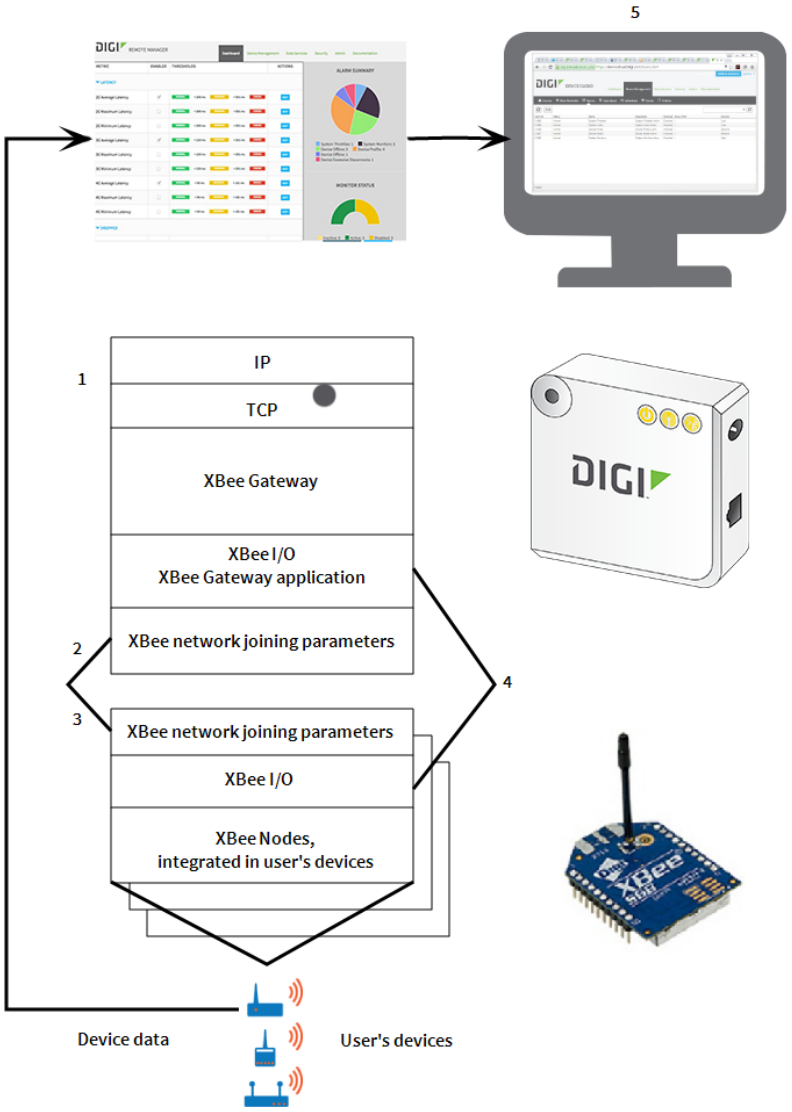
These instructions give an overview of how to set up XBee Gateway.

1. Configure the network settings. These settings include IP networking parameters and Remote Manager connectivity. For more information, see:
   - Wireless (Wi-Fi) network settings
   - Ethernet IP network settings
   - Mobile connectivity settings
2. Connect the XBee nodes to XBee Gateway. This step involves configuring the parameters for forming XBee networks on both XBee Gateway and XBee nodes. There are three substeps:
   a. Configure XBee Gateway as a coordinator.
   b. Join XBee nodes to the coordinator.
   c. Verify that the XBee nodes are joined to the coordinator.

   See Connect the XBee nodes to XBee Gateway for more information.
3. Configure XBee ZigBee network addressing settings. See Configure the ZigBee network addressing parameters for XBee nodes for more information.
4. Explore configuring XBee nodes for input/output.
   a. If using serial I/O, configure XBee nodes for serial I/O. See Explore serial I/O for more information.
   b. If using digital or analog I/O, configure the XBee nodes for digital or analog I/O. See Explore digital and analog I/O for more information.
5. Look at your device data on Remote Manager. See View your device data for more information.

The following image shows the layout of a fully set up XBee Gateway.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.



Joining ZigBee networks

ZigBee networks are called **Personal Area Networks** or **PANs**. In the ZigBee protocol, the only node that can start a new network is the coordinator. For that reason, each ZigBee network must have one coordinator.

XBee Gateway includes a built-in XBee ZigBee node already configured as coordinator. Therefore, as soon as you power on the XBee Gateway device, your ZigBee network is initialized.

To start a network, the coordinator must automatically choose a PAN identifier (**PAN ID**) and the operating **channel** for that network. Once those parameters are established and the network is

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 29 / 177
TESSOL Technical Library
TS-TL-DGI-049

initialized, the coordinator and routers can allow other devices (other routers or end devices) to join the network and route data.

Each network is defined with a unique PAN identifier (**PAN ID**). This identifier is common among all devices of the same network. That is, devices on the same ZigBee network must share the same PAN ID in order to communicate with each other. When you power on a coordinator, it automatically establishes the PAN ID or uses a pre-configured one when it creates the new network.

- If the PAN ID of the coordinator is 0, it performs a PAN scan to identify nearby ZigBee networks and uses a random unused PAN ID to start the new network. By default, an XBee Gateway coordinator is configured to generate a random PAN ID.
- If the PAN ID for a router or end device is 0, it performs a PAN scan and tries to join any available ZigBee network it finds.

You can connect to an XBee ZigBee module that is configured as a router node to the network initialized by XBee Gateway. By default, the PAN ID of this ZigBee module is configured to **0**. Therefore, if you power on the XBee ZigBee module and there is no other ZigBee network around, the module joins the ZigBee network initialized by XBee Gateway automatically. The joining operation occurs when the Association LED of the board on which the XBee ZigBee module is mounted starts blinking.

The 802.15.4 PHY (physical layer) protocol description defines 16 operating channels in the 2.4 GHz frequency band. Before starting the network, the coordinator automatically performs a channel scan to select a good channel to use for the network.

You can configure all the ZigBee nodes in a network with the channel or channels on which they operate.

Join XBee Gateway to an existing ZigBee network

Although this is not a common task, you can configure your XBee Gateway device to operate as a router and join an existing ZigBee network.

To join XBee Gateway to an existing ZigBee network:

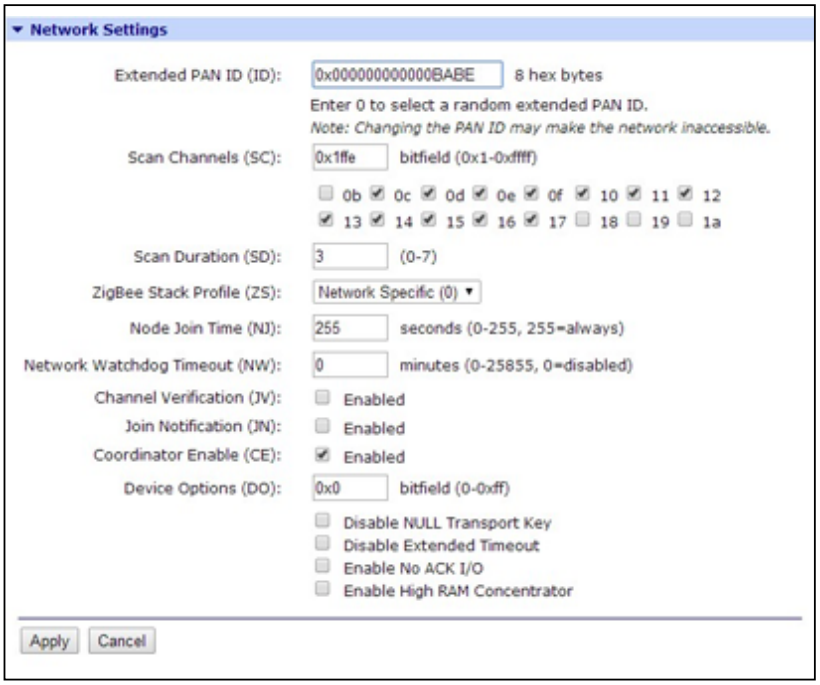
1. Open a web browser and type the URL of XBee Gateway: **http://192.168.100.1**. The XBee Gateway web interface appears.
2. Log in to the web interface:
   - **User name**: The default user name is **python**. If that user name does not work, it may have been changed by your system administrator. Contact your system administrator for help.
   - **Password**: The unique, default password is printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.
3. Click **XBee Network** in the left menu.
4. Select the XBee Gateway ZigBee local XBee device. The **XBee Configuration** page appears.
5. From the **XBee Configuration** page, click **Network Settings**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 30 / 177

6. Configure the Extended PAN ID (ID) option with the PAN ID of the network to which XBee Gateway should join.



7. Clear the **Coordinator Enable (CE)** check box. This allows XBee Gateway to behave as a router node within the ZigBee network.
8. Click **Apply** to save the changes to the device. After you apply the changes, XBee Gateway behaves as a router node and tries to connect to the ZigBee network with the PAN ID that you configured.

To join your XBee ZigBee module from the kit to an existing network, follow the steps described in Configure XBee Gateway with a custom PAN ID.

Configure XBee Gateway with a custom PAN ID

In some cases, you want control of the PAN ID used to create your ZigBee network. Use a custom PAN ID and configure the coordinator, routers, and end devices to use it when there are other networks around and you do not want your router or end device nodes to join them.

To configure XBee Gateway with a custom PAN ID:

1. Open a web browser and type the URL of XBee Gateway: **http://192.168.100.1**. The XBee Gateway web interface appears.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

2. Log in to the web interface:
   - **User name**: The default user name is **python**. If that user name does not work, it may have been changed by your system administrator. Contact your system administrator for help.
   - **Password**: The unique, default password is printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.
3. Under **Configuration**, click **XBee Network**.
4. Select the XBee Gateway local XBee device that you want to configure. The **XBee Configuration** page appears.
5. From the **XBee Configuration** page, click **Network Settings**.
6. Configure the Extended PAN ID (ID) option with your custom PAN ID value.
7. Click **Apply** to save the changes to the device. After applying the changes, the coordinator initializes the ZigBee network with the new PAN ID. If you had any other ZigBee nodes connected to the network, you must update their PAN IDs so they will join the new one.

XBee Gateway and non-XBee ZigBee Devices

You can refer to additional resources to learn about using XBee Gateway with non-XBee ZigBee devices. Digi provides support and resources for your use of the product.

Resources include:

- Digi forum
- Digi Knowledge Base
- *XBee/XBee-PRO ZB RF Modules User Guide* for more information about features and operation of the XBee RF module mounted inside the gateway
- XBee ZigBee information on the Digi XBee ZigBee product page

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Administration and maintenance tasks

There are several administrative and maintenance tasks that you need to perform periodically on XBee Gateway. This topic covers common administrative tasks and how to perform them through Remote Manager and the web interface.

Logging in to the web interface

When you access the web interface, a log in screen displays. You must enter a user name and password specified for the device.

- **User name**: The default user name is **python**. If that user name does not work, it may have been changed by your system administrator. Contact your system administrator for help.
- **Password**: The unique, default password is printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.

File management

The XBee Gateway file management feature lets you manage custom applications, their associated data files, and other files. The File Management page is available in Remote Manager and in the web interface.

You can also push firmware update files to the device file system, and pull log files from the device file system. See XBee Gateway file system for information about the file system.

File Management page in Remote Manager

You can use the **File Management** page in Remote Manager to load files, such as custom application files, onto XBee Gateway and display current information about loaded files.

You can also use this page to download system log files from XBee Gateway to view for troubleshooting or other purposes. These log files are in the /WEB/logging folder. For a description of the XBee Gateway file system layout, see XBee Gateway file system.

Note Digi recommends using no more than 20 MB for custom applications, as XBee Gateway requires a portion of the same space to be capable of managing persistent system logs and firmware updates.

Access the File Management page

Follow this process to access the **File Management** page in Remote Manager:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

1. Access Remote Manager and log in. If you do not yet have a Remote Manager account, click the **Sign up** link on the Remote Manager log in page.
2. Click the **Device Management** tab.
3. From the list of devices, double-click on the device you want to review.
4. Click the **File Management** link in the left-hand pane. The **File Management** screen displays.

File Management toolbar

The File Management toolbar provides quick access to file management tasks.

Button/Field	Name	Description
	Upload file	Opens a dialog for uploading files to the current folder (directory).
	Download file	Downloads the selected file to a computer. You can choose to open the downloaded file with a specified tool or save it.
	Delete	Deletes the selected items.
	Refresh	Refreshes the list of folders and files displayed.
	Back	Move to the previous folder in folder history.
	Forward	Move to the next folder in folder history.
	Home	Returns to the root folder.
/WEB	Current or destination folder	An editable field that displays the current folder. You can use this field to type a different destination directory.
Go	Go	Goes to the directory specified in **Current or destination folder** field.

File Management page in the XBee Gateway web interface

You can use the **File Management** page to load files onto XBee Gateway and display current information about loaded files. For a description of the XBee Gateway file system layout, see XBee Gateway file system.

Access the File Management page

Follow this process to access the **File Management** page in the web interface:

1. Access and log into the web interface.
2. Click **File Management** under **Administration** to launch the **File Management** page.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

File Management page

The following fields and buttons appear on the **File Management** page:

Volume Information section: Displays the current directory for loading files and free space remaining.

Note Digi recommends using no more than 20 MB for custom applications, as XBee Gateway requires a portion of the same space to be capable of managing persistent system logs and firmware updates.

Upload to Current Directory section: Uploads files to the current directory.

- **Choose File**: To find a file on your computer, click **Choose File** and go to the file.
- **Update file**: Click **Update file** to begin the file upload process.

File List: A listing of the current directory (as noted in the **Volume Information** section) on the device.

- **Open**: Opens a directory after it is selected in the file list. The current directory changes and the list is updated.
- **Make Directory**: Creates a new, empty directory in the current directory.
- **Save As**: Downloads a regular file from the file system to your local computer.
- **Remove**: Deletes files or empty directories. If there are one or more files in a directory, the directory cannot be deleted.

Refresh button: Reloads the information on the page.

Certificate Management

The Certificate Management feature allows you to load and manage entries in a database that contains certificate and private key data.

Note A link to the **Certificate Management** page is available in the web interface only if the XBee Gateway device is the Ethernet + Wi-Fi version. A link to this page is not available in the web interface for the Ethernet or Ethernet + Cellular device versions.

This feature supports:

- Displaying certificate database entries
- Loading certificate database entries
- Saving certificate database entries
- Removing certificate database entries
- Importing a private key for the Digi device into the database

Certificates and public/private host key pairs are an integral part of public key infrastructure (PKI) based security.

Certificate Management page in the web interface

1. Access and log into the web interface.
2. Click **Administration** > **Certificate Management**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Note The link to the **Certificate Management** page is available in the web interface only if the XBee Gateway device is the Ethernet + Wi-Fi version.

The following fields and buttons appear on the Certificate Management page:

- **Volume Information**: Displays information about the user file system, /userfs.
- **Current Directory**: Certificates are saved in this directory on the device. Note that navigating to the file system is not possible on this page. To go to the file system, click **File Management** under **Administration** and then go to the file system.
- **Free Space**: The amount of free space on the user file system. The typical size of a backup file is about 8 KB.
- **Upload Certificate**: Uploads a certificate to XBee Gateway.
- **Current Certificates**: Lists all the certificates currently loaded on XBee Gateway.
- **Refresh** button: Refreshes the list of certificates.
- **Activate** button: Activates the loaded certificates.

Back up or restore the configuration

After you configure XBee Gateway device, back up the configuration settings. You can back up the settings from the Remote Manager or the web interface.

Having a backup of the configuration settings is recommended if you run into one of the following situations:

- You need to restore the configuration settings because a problem occurred.
- You upgraded or added the firmware and you need to restore your configuration settings.
- You added new devices that need to be configured and want to use the same configuration settings as the original device. In this instance, you can load the backup configuration settings from the original device onto other devices.

Back up and restore files from Remote Manager

1. Access Remote Manager and log in.
2. From the **Devices** page, click the devices in the Device list that you want to back up.
3. Click the **More** button within the toolbar and then select the **Export Properties** option from under the **Devices** category.
4. Choose one of the following options from the **Export Properties** dialog and then click **OK**:
    - **Export all**: Exports the device's entire configuration. The option allows you to export the entire configuration, including IP address information, and provides you with a complete backup configuration for the device.
    - **Export all except unique network and device identity properties**: Exports the non-networking portion of the configuration. Choose this option if you want to use this device's configuration as a template to apply to a group of devices in the future.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 36 / 177

Back up and restore files from the XBee Gateway web interface

The **Backup/Restore** page allows you to back up and restore the following device configuration settings to a file:

- XBee Gateway
- (Optional) XBee RF module

Back up files

To back up files from the XBee Gateway web interface:

1. Access and log into the web interface.
2. Click **Administration** > **Backup/Restore**.
3. In the **Volume Information** section, review the amount of free space available.
4. If you want to save the configuration settings for the XBee RF module along with the device configuration settings, select the **Include XBee gateway radio settings in the backup file** option.
5. In the **Backup** field, enter the name of the back up file.
6. Click **OK** to start the process.

Restore files

To restore files from the XBee Gateway web interface:

1. Access the XBee Gateway web interface. You are required to log in to the web interface.
2. Click **Backup/Restore** under **Administration**.
3. Click **Choose File** in the **Restore Configuration** section.
4. Select the configuration file you want to restore.
5. Click **OK**.
6. Click **Restore** to restore the configuration from the selected file.

Backup/Restore page

The following fields and buttons appear on the **Backup/Restore** page:

Volume Information section: Displays information about the user file system, /userfs.

- **Current Directory**: The backup file is temporarily saved in this directory on the device. Note that navigating to the file system is not possible on this page. To go to the file system, click **File Management** under **Administration** and then go to the file system.
- **Free Space**: The amount of free space on the user file system. The typical size of a backup file is about 8 KB.

Backup Configuration section: Downloads the gateway configuration file through the web browser and allows you to save the file on your computer.

- **Include XBee gateway radio settings in the backup file**: If enabled, the configuration settings for the XBee RF module are saved along with the device configuration settings.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- **Backup**: The name of the backup file. The default file name is **backup.cfg**. You can change the file name from the **save file** dialog box. Any name is allowed.

Restore Configuration section: Restores configuration settings from a backup file on your computer or a server.

- **Choose File**: Opens a browse dialog for locating and selecting the appropriate configuration file.
- **Restore**: Click **Restore** to restore the configuration from the selected file.

Errors

Any errors that occur during the restore process appear in a red banner at the top of the **Backup/Restore** page. Typically, the only reason an error occurs is if a user has modified the backup file. The following list provides some of the possible error messages.

- **Invalid file contents**: The file contents are not a valid backup format. This may be caused by invalid XML syntax.
- **Element set_setting has extra content (name)**: The settings group name is not recognized.
- **Element set_setting failed to validate content (name)**: Incorrect value for setting name.
- Other RCI errors are possible, but are less common.

Update firmware

There are several types of firmware updates for XBee Gateway:

- **XBee Gateway operating system**: You can download Gateway operating system firmware updates for XBee Gateway from the Digi Support site. You can then load the firmware through the web interface or Remote Manager.

  You can only upgrade the gateway operating system, not downgrade it, through the web interface or Remote Manager. The firmware image contains a certificate that is verified before XBee Gateway accepts an upgrade.
- **XBee RF module on the gateway**: See Update the local XBee Gateway firmware.
- **XBee RF modules on your local network to be delivered Over the Air (OTA)**: As XBee networks can involve a large number of nodes, Digi provides a way to schedule automatic XBee Gateway firmware updates and manage firmware files. In the XBee Gateway web interface, OTA firmware updates are performed from a page linked from the XBee Configuration page. These firmware updates are supported for XBee ZigBee modules only. For information on these updates, see XBee network OTA firmware updates.

Update firmware from Remote Manager

You can update the firmware from Remote Manager:

- Update the XBee Gateway device operating system firmware
- Update the local XBee Gateway firmware
- Update the XBee network node firmware (OTA updates) from Remote Manager

You can also schedule firmware updates from Remote Manager.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 38 / 177

Update the XBee Gateway device operating system firmware

To update the XBee Gateway device operating system firmware:

1. Download the appropriate firmware from XBee Gateway product support page. For more details on firmware filename conventions, see About firmware files.
2. Log in to Remote Manager.
3. Click the **Device Management** tab.
4. Select one or more devices from the device list to which you want to apply firmware updates, right-click, and select **Update Firmware**.
5. Type or browse to the .bin filename containing the firmware update.
6. Click **Update Firmware**.

Update the local XBee Gateway firmware

To update the local XBee Gateway firmware:

1. Download the appropriate firmware from the XBee Gateway product support page. For more details on firmware file name conventions, see About firmware files.
2. Log in to Remote Manager.
3. Click the **Device Management** tab.
4. Go to the device list.
5. Select one or more devices to which you want to apply firmware updates, right-click, and then select **Update Gateway XBee Radio Firmware**.
6. Type or browse to the **.ebl** filename containing the firmware update.
7. Click **Update Firmware**.

   The XBee Gateway firmware is updated. If the gateway is enabled, most XBee Gateway module settings will be preserved when the firmware update completes. Some settings, such as encryption keys, may not be preserved and must be entered again.
8. If required, type your encryption keys.

Schedule firmware updates

You can schedule firmware updates from Remote Manager. See the *Digi Remote Manager User Guide* for more information on scheduling firmware updates.

1. Log in to Remote Manager.
2. Click the **Device Management** tab.
3. From the list, select the device for which you want to schedule a firmware update.
4. Right-click on the device, and choose **Firmware** > **Update Firmware**. The **Update Firmware** dialog appears.
5. In the **File** field, enter or browse for the file containing the firmware update.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 39 / 177

6. From the **Schedule Options** drop-down in the upper right corner of the dialog, select the appropriate scheduling option.
7. Click **Update Firmware** to schedule the update.

Update firmware from the XBee Gateway web interface

Firmware updates are available from the **Administration** > **Firmware Update** page in the XBee Gateway web interface.

- Update the XBee Gateway device operating system firmware
- Update the local XBee Gateway firmware

Update the XBee Gateway device operating system firmware

To update the XBee Gateway device operating system firmware:

1. Download the appropriate firmware from the XBee Gateway product support page. For more details on firmware filename conventions, see About firmware files.
2. Access and log into the web interface.
3. Click **Administration** > **Firmware Update**. The **Firmware Update** page appears.
4. Select the **Upgrade device operating system** check box.
5. Click **Next**.

   Status information for the firmware update appears, including the following information:

   - **Target Firmware**: The device operating system firmware to be loaded on XBee Gateway.
   - **Status**: The current status of the firmware update operation.

     For the XBee Gateway device operating system, the firmware update operation moves through several states:

     a. The web browser uploads the firmware file.

     b. The firmware update is applied to the XBee Gateway operating system. If the firmware update is successful, the message **Firmware Upgrades Completed Successfully** appears. If errors occur during the update, the message **Completed with errors** appears. If you need help understanding the errors and viewing the log file containing the errors, contact Digi Support.

     c. XBee Gateway automatically reboots.

     d. XBee Gateway returns to an operating state (run). All these states are shown on the **Firmware Update** page.

Update the local XBee Gateway firmware

To update the local XBee Gateway firmware:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 40 / 177

1. Download the appropriate firmware from the XBee Gateway product support page. For more details on firmware filename conventions, see About firmware files.
2. Access and log into the web interface.
3. Click **Administration** > **Firmware Update**. The **Firmware Update** page appears.
4. Select the **Upgrade local (gateway) XBee's firmware** check box.
5. Click **Next**.
6. Type or browse to the filename containing the firmware update.
7. Click **Next**.

   Status information for the firmware update appears, including the following information:

   - **Target Firmware**: The device operating system firmware to be loaded on XBee Gateway.
   - **Status**: The current status of the firmware update operation.

   The XBee firmware is updated. If the gateway is enabled, most XBee module settings will be preserved when the firmware update completes. Some settings, such as encryption keys, may not be preserved and must be entered again.
8. If required, type your encryption keys.

About firmware files

Firmware files for the operating system and XBee module on XBee Gateway are available through Digi Technical Support on the XBee Gateway Support page. Click the **Firmware Updates** link.

Gateway operating system firmware files

Gateway operating system firmware files have a **.bin** extension.

XBee RF module firmware files

XBee RF module firmware files have an **.ebl** extension. From the Digi XBee Gateway - Zigbee support page, click the **Firmware Updates** option. You can select the product and then download the firmware.

There is only one firmware file for the XBee RF module in XBee Gateway products. It is named **XBP24-S2C_40*XX*.ebl**, where ***XX*** is the firmware version.

There are other possible file types for OTA firmware updates. See XBee network OTA firmware updates.

Mobile device status

The items on **Mobile Status** page are specific to a cellular modem or service provider account. These items vary in the information reported from modem to modem and also differ between CDMA and GSM services. A value that appears here depends on the modem type and connection state; if there is no value for a status field, it does not appear. Use this information when troubleshooting issues and communicating with technical support.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 41 / 177

Display the mobile device status

To display the status of mobile device, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Select **System Information** > **Mobile Information**. The **Mobile Information** page appears.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Click **Administration** > **Mobile Status**. The **Mobile Status** page appears.

Mobile Status page

The following table describes the fields on the **Mobile Status** or **Mobile Information** page.

Status field	Cellular modem type	Description
Device type	Both	The type of cellular modem. The possible values are CDMA and GSM.
Manufacturer	Both	The manufacturer of the cellular modem.
Model	Both	The manufacturer's model number for the cellular modem.
Revision	Both	The manufacturer's version number for the software running on the cellular modem.
Serial number	Both	The manufacturer's serial number for the cellular modem.
Phone number	Both	The phone number stored on the SIM (for GSM) or cellular modem (for CDMA). The SIM may not have a number stored, or it may not be correct.
SIM IMSI	GSM	The International Mobile Subscriber Identity (IMSI) for the SIM card. This value is the account number for the mobile subscriber.
SIM ICCID	GSM	The Integrated Circuit Card Identifier (ICCID) for the SIM card. This value is the serial number of the SIM card.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 42 / 177

Status field	Cellular modem type	Description
SIM PIN status	GSM	Indicates the lock status of the SIM. There area many possible status values. The most common status values are: ■ **READY**: SIM is ready. The PIN was entered or no PIN is required. ■ **SIM PIN**: A PIN is required to unlock the SIM. You can enter the PIN from the Mobile Configuration page. ■ **SIM PUK**, **SIM PIN2**, **SIM PUK2**, and similar codes: The SIM is locked and cannot be unlocked by the XBee Gateway cellular device. It must be placed in another device or phone to be unlocked. ■ **Error**: Either the SIM was not inserted or there was another SIM problem.
SIM slot index	GSM	This status only appears for products that support multiple SIMs. Indicates which SIM slot is currently in use by the device. ■ 0 means the first slot. ■ 1 means the second slot.
MEID	CDMA	Mobile equipment identifier (MEID). A globally unique number identifying a physical piece of CDMA mobile station equipment.
PRL version	CDMA	Preferred Roaming List version number. Updates are done at the same time as provisioning. Note that this may change with new modems.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Status field	Cellular modem type	Description
Provisioning status	CDMA	Specifies the status of the provisioning process for the cellular modem, Provisioning is the process by which the cellular modem is configured with the information required to access the cellular network. ■ **Not provisioned**: The modem is not provisioned. Contact your mobile service provider to make sure your device is registered to your mobile account. ■ **Provisioned**: The modem is configured and ready to use. ■ **In progress**: The modem is in the process of being provisioned. ■ **Failed**: Provisioning was unsuccessful. This may be caused by a poor signal, or the cellular modem was not activated with the carrier.
Signal strength	Both	Received cellular signal strength indicator (RSSI) for GSM and CDMA. A measure of the signal level of the network. Different RSSI levels are used by GSM and CDMA to determine the number of bars. ■ **For GSM**: -108 or more is 1 bar, -93 is 2, -77 is 3 bars. ■ **For CDMA**: -105 or more is 1 bar, -90 is 2, -75 is 3 bars.
Signal level	Both	The number of bars indicates the strength of the received cellular signal. ■ **0**: No signal ■ **1**: Poor signal ■ **2**: Adequate signal ■ **3**: Good signal
Signal quality	Both	An indicator of the quality of the received cellular signal, measured in dB. This value is also known as **Ec/Io**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 44 / 177

Status field	Cellular modem type	Description
Registration status	Both	The status of the cellular modem's connection to a cellular network. ■ **Not registered** ■ **Registered (Home network)** ■ **Searching for Network** ■ **Not Registered (Access Denied)** ■ **Not Available (Reason not Known)** ■ **Registered (Roaming)**
Cell ID	GSM	Identifier of the cellular base station with which the cellular modem is registered.
System ID	CDMA	The system identification number of the cellular network with which the cellular modem is registered.
Network ID	CDMA	The network identification number of the cellular network with which the cellular modem is registered.
Location area code	GSM	Identifier of the location of a group of cellular base stations with which the cellular modem is registered, in hexadecimal format.
Mobile country code	GSM	Identifies a mobile phone operator/carrier with which the cellular modem is registered.
Mobile network code	GSM	Identifies a mobile phone operator/carrier with which the cellular modem is registered.
Operator name	GSM	The name of the mobile operator with which the modem is registered. This corresponds to the mobile country and network codes.
Band	GSM 2G service only	The radio frequency band used by the modem. GSM can use one of the following bands: ■ **GSM 850** ■ **GSM 900** ■ **DCS 1800** ■ **PCS 1900** Future modems may have different values.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 45 / 177

Status field	Cellular modem type	Description
Service	CDMA	The type of data service provided by the cellular network. For CDMA, the data service is one of the following: ■ **None** ■ **1xRTT** ■ **EVDO Rev 0** ■ **EVDO Rev A** Future cellular modems may have other values.
Channel	Both	Radio channel being used by the cellular modem.
Profile	Both	The current set of mobile configuration settings used to configure the cellular modem. XBee Gateway cellular products always use profile **0**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Status field	Cellular modem type	Description
Connection state	Both	The operating state of the cellular modem. The possible states are as follows: ■ **Initializing**: Resetting and configuring the modem. ■ **Registering**: Searching for the modem's cellular network. ■ **Delay before connecting**: The modem delays after an unsuccessful connection (Verizon only). ■ **Connecting**: Establishing a mobile data connection. ■ **Connected**: Established an active mobile data connection . ■ **Disconnecting**: Ending the mobile data connection. ■ **Disconnected**: Ended the mobile data connection. See Disconnect reason for the cause. ■ **Disabled**: The mobile data connection is disabled in the configuration settings. ■ **Provisioning**: Configuring the modem to access the mobile carrier (CDMA only). ■ **PRL update**: Updating the preferred roaming list (CDMA only). ■ **Operator scan**: Searching the modem for available mobile operators (GSM only). ■ **No device found**: The modem is not available or is malfunctioning.
Connection duration	Both	Amount of time the current mobile data connection has been active. The format is N days HH:MM:SS.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 47 / 177

Status field	Cellular modem type	Description
Connection error	Both	This status appears only after a connection error occurs. The possible reasons the previous connection attempt failed are as follows: ■ **SIM PIN required**: The SIM PIN must be entered on the Mobile Configuration page. ■ **SIM PIN incorrect**: The SIM PIN entered does not match the actual one for the SIM. ■ **SIM not ready**: No SIM inserted or other SIM problem. ■ **Not registered**: The modem did not register with a cellular network. ■ **Dial failed**: Error starting data connection. ■ **Authentication failed**: Incorrect login or password entered on the Mobile Configuration page. ■ **Connection timeout**: Connection did not complete. ■ **Device reset error**: The modem could not be reset. ■ **Device open error**: The modem is malfunctioning. ■ **Device config error**: The modem could not be configured. ■ **PPP error**: Internal system error.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Status field	Cellular modem type	Description
Disconnect reason	Both	This status appears after a previous connection ends. The possible reasons the previous connection ended are as follows: ■ **User requested**: Initiated by user action. ■ **Network disconnect**: Initiated by cellular network or carrier. ■ **Carrier loss**: Poor signal or disconnected by network. ■ **Connection timer**: Connection did not complete. ■ **Receive idle timer**: No data received for configured receive idle time. ■ **Device monitoring error**: Error while monitoring the modem status. May indicate a malfunctioning modem.
IP address	Both	Internet protocol address of the mobile data interface. You can contact the device at this IP address if permitted by the carrier.
Peer address	Both	Internet protocol address of the mobile data server. This IP address is typically provided as background information, and not normally used to communicate with the device.
DNS primary address	Both	IP address of the primary Domain Name System (DNS) server assigned by the mobile carrier. This server resolves domain names to IP addresses. See Default behavior regarding DNS for more information on how XBee Gateway uses the DNS primary and secondary address.
DNS secondary address	Both	IP address of the backup DNS server assigned by the mobile carrier.
Receive idle time	Both	The amount of time since the cellular modem last received data.
Transmit idle time	Both	The amount of time since the cellular modem last transmitted data.
Connections	Both	The number of mobile data connection attempts since the XBee Gateway cellular device was started.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 49 / 177

Status field	Cellular modem type	Description
Connection errors	Both	The number of unsuccessful mobile data connection attempts since the XBee Gateway cellular device was started.
Carrier loss	Both	The number of times the connection was lost because of poor signal or being disconnected by the network.
LCP echo failed	Both	The number of failed Link Control Protocol (LCP) echo requests that were sent after a “quiet” interval to test the cellular link and/or keep it alive. Not used by XBee Gateway cellular products.
Idle timeout	Both	The number of connection resets that occurred because the idle timeout reached/exceeded the maximum allowed for transmitted and received data.
User disconnect	Both	The number of disconnects of the cellular connection performed by device users. This type of user disconnect occurs when a user provisions the cellular modem.
Monitoring errors	Both	Number of errors encountered while monitoring the cellular modem status. May indicate a malfunctioning modem.
Device resets	Both	Number of cellular modem resets caused by errors, failed connection attempts, or user requests.
Received bytes	Both	Number of bytes received by the cellular modem during the current data session.
Transmitted bytes	Both	Number of bytes transmitted by the cellular modem during the current data session.
Total received bytes	Both	Total number of bytes received by the modem since the XBee Gateway cellular device was started.
Total transmitted bytes	Both	Total number of bytes transmitted by the modem since the XBee Gateway cellular device was started.

Change the password for the web interface

You can change the current password for the **python** user account, which is used to access the web interface. You can use any of the following methods.

If you have not changed the password from the default, note that each device has a unique, default password printed on the device label. If the password is not on the device label, the default password is **dbps**. If neither these defaults work, the password may have already been updated. Contact your system administrator for help.

Linux command shell

1. Connect and log in to the XBee Gateway device.
2. At the prompt type: `passwd`

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

3. At the `Old Password` prompt, enter the current password.
4. At the `New Password` prompt, enter the new password.

Web interface

1. Access the XBee Gateway web interface.
2. Select **Configuration** > **Authentication**.
3. In the **Current Password** field, enter the current password.
4. In the **New Password** field, enter the new password.
5. In the **Confirm Password** field, re-enter the new password.
6. Click **Apply**.

RCI from the Linux command shell

1. Connect and log in to the XBee Gateway device.
2. Type the following, replacing `NEW_PASSWORD` with the new password you wish to use and `CURRENT_PASSWORD` with your existing password:

```
rci_request '<do_command target="set_
password"><login>python</login><password>NEW_PASSWORD</password><current_
password>CURRENT_PASSWORD</current_password></do_command>'
```

Note If the password contains the following characters, you will need to escape those characters following standard Linux shell conventions: ' (apostrophe), < (less than sign), > (greater than sign).

3. If successful, the following message appears:

```
<rci_reply version="1.1"><do_command target="set_password"></do_
command></rci_reply>
```

If an error is encountered, the following message appears:

```
<rci_reply version="1.1"><do_command target="set_password"><error
id="4"><desc>Update failed</desc><hint>password</hint></error></do_
command></rci_reply>
```

You can check the system logs for more information on the error.

RCI from Python

The `rci` module in Python can process RCI using the `process_request` method. It accepts as a single argument an RCI request, and returns the response. The `set_password` request matches the request used in RCI from the Linux command shell (as described above), but wrapped in the `rci_request` tag.

Copy and enter the code below, replacing `NEW_PASSWORD` with the new password you wish to use and `CURRENT_PASSWORD` with the existing password.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

```
<rci_request>
  <do_command target="set_password">
    <login>python</login>
    <password>NEW_PASSWORD</password>
    <current_password>CURRENT_PASSWORD</current_password>
  </do_command>
</rci_request>
```

Note The `set_password do_command` to change the python password is only available in XBee Gateway firmware versions 3.2.30.x and newer.

RCI from Digi Remote Manager

1. From a web browser, log in to Remote Manager.
2. Select **Documentation > API Explorer**. The API console appears.
3. From the API console, select POST HTTP Method and write the following SCI request, as follows:

```
<sci_request version="1.0">
  <send_message>
    <targets>
      <device id="{device_id}"/>
    </targets>
  <rci_request version="1.1">
    <do_command target="set_password">
      <login>python</login>
      <password>NEW_PASSWORD</password>
      <current_password>CURRENT_PASSWORD</current_password>
    </do_command>
  </rci_request>
  </send_message>
</sci_request>
```

   Where:

   - **{device_id}** is the ID of your XBee Gateway device.
   - **NEW_PASSWORD** is the new password you want to use.
   - **CURRENT_PASSWORD** is the existing password.

4. Click **Send**.

Display the XBee Gateway End User License Agreement (EULA)

You can access the End User License Agreement (EULA) for XBee Gateway from the web interface.

Note The XBee Gateway EULA is not available through Remote Manager.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

1. Access and log into the web interface.
2. Click **Legal Notices** under **Administration**. The EULA for XBee Gateway appears.

Restore XBee Gateway factory defaults

You can restore the device to its factory default configuration. This action clears any configuration settings you may have entered through the supported device interfaces. This feature is assigned to the button by default.

On the XBee Gateway device, press and hold the button for ten seconds to return the device settings to factory defaults.

Reboot XBee Gateway

You can reboot XBee Gateway as needed. Note that XBee Gateway reboots itself if you make changes to the configuration that require a reboot to activate those changes.

To reboot XBee Gateway, choose one of the following options:

- From Remote Manager, right-click the XBee Gateway device and select **More** > **Reboot**.
- From the web interface, click **Administration** > **Reboot**.

Wait approximately one minute for the reboot to complete.

Display system information

To display system information, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Click **System Information**. The **System Information** page appears.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. View general system information and system statistics from the **Home** page.

Disconnect XBee Gateway from Remote Manager

You can disconnect XBee Gateway from Remote Manager.

1. Log in to Remote Manager.
2. Click the **Device Management** tab.
3. From the device list, select the XBee Gateway device that you want to disconnect.
4. Select **More** > **Disconnect**. A confirmation dialog displays.
5. Click **Yes** to complete the disconnect process.

   If XBee Gateway is configured to automatically reconnect to Remote Manager, the device re-establishes the connection to Remote Manager after its reconnection timeout period has expired.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 53 / 177

About programming

XBee Gateway offers a variety of interfaces that produce and/or consume data. Developing software programs for XBee Gateway products allows Digi customers to provide custom logic to control the information to and from these interfaces.

This section introduces the Digi programming tools and resources available to you. You can also see Program XBee Gateway using Python to learn about programming elements and operations available for XBee Gateway using annotated example programs.

Python

XBee Gateway features a standard Python 2.7.1 distribution, allowing you to develop and test applications that are not dependent on Digi-proprietary interface modules. Python is a dynamic, object-oriented language for developing software applications, from simple programs to complex embedded applications.

The standard Python 2.7.1 distribution has a more complete library set than the versions supported in predecessor gateway products, and integrates well with standard Python. You can typically transfer scripts developed in this manner to the device for final testing at the end of the development cycle, with a computer serving as a device proxy during the bulk of development.

For detailed information about programming with Python, see Program XBee Gateway using Python.

The sections below describe the basic Python applications that you may use:

- **Python**: XBee Gateway features a standard Python 2.7.1 distribution, allowing you to develop and test applications that are not dependent on Digi-proprietary interface modules. Python is a dynamic, object-oriented language for developing software applications, from simple programs to complex embedded applications.

  For more information, see Program XBee Gateway using Python.
- **XBee Gateway Python application**: The XBee Gateway Python application resides on XBee Gateway. Its key functions include connecting your XBee modules to Remote Manager, enabling uploads of data to Remote Manager, and receiving remote text and commands. Python application is installed by default in your XBee Gateway device and automatically starts when the gateway is initialized.

  For more information on the XBee Gateway Python application, see XBee Gateway Python application and Remote Manager.
- **Digi ESP**: Digi ESP is an IDE featuring device detection, debugging, compiling, and downloading of Device Integration Application (DIA)/Python code to Digi gateways.

  For more information, see Digi ESP for Python.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

- **DIA**: Device Integration Application (DIA) is an application software platform for Digi gateways. DIA makes it easy to connect remote devices and sensors to Digi gateway products.
  For more information, see DIA software.
- **Linux command shell**: The Linux command shell interface that is available on XBee Gateway is useful for some programming and device management tasks. With the Linux command shell, you can experiment with the Python interpreter interactively, create scripts, launch scripts, and control the script operation.
  For more information, see Linux command shell (command line interface).

XBee ZigBee Cloud Kit web application source code

You can use the XBee ZigBee Cloud Kit web application source code and other tools available on Github to build your own custom applications.

The source code for the XBee ZigBee Cloud Kit web application is located at https://github.com/digidotcom/XBeeZigBeeCloudKit.

For more information on the XBee ZigBee Cloud Kit, see the XBee ZigBee Cloud Kit support page.

Programming calls through Server Command Interface (SCI) and Remote Command Interface (RCI)

You can use the Web Services Server Command Interface (SCI) and the Remote Command Interface (RCI) as an alternative means of getting settings and state data from the device. For more information, see:

- SCI (Server Command Interface) chapter of the *Digi Remote Manager Programmer Guide*
- *Remote Command Interface (RCI) Specification* document

XBee Gateway file system

XBee Gateway supports standard Linux shell file operations for managing directories and files.

You can access the file system resident on XBee Gateway through the following interfaces:

- Web interface
- Command line interface
- Remote Manager

Important directories

/WEB/python

The /WEB/python/ directory contains user-specific files, such as custom Python applications. You can create subdirectories in this area for the customer's applications. This area is read-write.

/WEB/logging

The /WEB/logging directory contains system log files, including eventlog.txt, python.log, digi.log, xbee.log, and sef.log. These files are read-only. For more information on these files, see XBee Gateway system log.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 55 / 177

Load applications onto XBee Gateway

To load an application onto XBee Gateway, use the File Management function in Remote Manager or the XBee Gateway web interface. For instructions, see File management.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Program XBee Gateway using Python

XBee Gateway features a standard Python 2.7.1 distribution, allowing you to develop and test applications that are not dependent on Digi-proprietary interface modules. Python is a dynamic, object-oriented language for developing software applications, from simple programs to complex embedded applications.

The standard Python 2.7.1 distribution has a more complete library set than the versions supported in predecessor gateway products, and integrates well with standard Python. You can typically transfer scripts developed in this manner to the device for final testing at the end of the development cycle, with a computer serving as a device proxy during the bulk of development.

The following sections contain information about programming XBee Gateway with Python:

Find Python learning resources 58
Digi-specific Python modules for programming 58
Sample programs 58
XBee Gateway Python application and Remote Manager 62
Configure a Python application in the web interface 86
Digi ESP for Python 87
DIA software 91
Linux command shell (command line interface) 91

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Find Python learning resources

You can learn more about programming with Python by referring to the following sections.

Python support forum

You can find answers to common questions and exchange ideas and examples with other members of the Digi Python development community at the Digi Forum.

Digi Python Wiki Archive Reference Manual

The *Digi Python Wiki Archive Reference Manual* provides references for developing solutions using the Digi communications portfolio, software and services, including Python, Remote Manager, DIA, and more. This manual includes how-to's, example code, and M2M information to speed application development.

Digi-specific Python modules for programming

Several Digi-provided built-in modules apply to functionality in XBee Gateway and are documented in the ConnectPort X2e section in the *Digi Python Wiki Archive Reference Manual*. From that section, you can go to the information pages on these modules:

- **digihw**: Provides an interface to local hardware.
- **idigimsg**: This is an internal module with functions used by DIA and Smart Energy Framework.
- **rci**: Provides a mechanism for processing arbitrary RCI request strings, as well as a means to set up callbacks to allow Python scripts to respond to remote requests made via specialized RCI commands.
- **uptime**: Allows access to the Linux **gettime** function for various clocks.
- **watchdog**: A safeguard that an application can use for critical operations, in which, if the application threads do not service their watchdog within the promised interval, the entire system reboots.
- **xbee**: A collection of utility methods for programming the XBee RF module on XBee Gateway. It also includes the Python XBee socket interface support.
- **digisms**: For low-level, generic SMS message handling.
- **idigisms**: For communicating using Remote Manager SMS protocol to or from Remote Manager.

Sample programs

These simple annotated samples introduce several programmable features for XBee Gateway, including:

- Button handling
- LED control
- Watchdog

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 58 / 177

- RCI callback
- XBee functions

Button handling

The following sample program demonstrates functions for handling the button on XBee Gateway.

```
import select

fd=open('/var/run/reset_button')(1)
p=select.poll()
p.register(fd, select.POLLPRI)                    (2)
fd.read()                          (3)
while True:
       p.poll()                      (4)
       fd.seek(0)               (5)
       val = int(fd.read()[0])          (6)

       if val:                        (7)
               print "Button pressed!"
      else:
               print "Button released!"
```

Program notes

1. The reset button is exposed as a Linux file. It can be read to determine the state of the button, and it is possible to block waiting for the button state to change.
2. To block waiting for the button, the standard Python select module is used. This line, and the line above, demonstrate how to create a polling object that can wait for button state changes.
3. Read the current value of the button, but forget it. This is done to “clear” the button and prepare to wait for its state changes.
4. Rather than reading the button in a loop, the system waits for button state changes using the polling object created earlier.
5. To read the current value, the system first “rewinds” to the beginning of the “file.”
6. fd.read() gets pending data from the button file. fd.read()[0] returns the first character of that data. int(fd.read()[0]) makes explicit the fact that the system expects the character it reads to be an integer.
7. If the system reads a non-zero value, the button is currently pressed.

LED control

Controlling the LEDs on XBee Gateway is handled through the user_led_set function. This sample program controls the Network LED.

Note that if native features are still assigned to the LED, those behaviors will mix with the behaviors in the sample program.

Note The highlighted numbers in the sample code correspond to the items in the Program Notes, below.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

```
import digihw                    (1)
import time

while True:
         digihw.user_led_set(True,1)                    (2)
         time.sleep(1.0)
        digihw.user_led_set(False,1)                    (3)

        digihw.user_led_set(True, 2)                    (4)
        time.sleep(1.0)
        digihw.user_led_set(False,2)                    (5)
```

Program notes

1. The digihw module includes the user_led_set function needed by the program. The user_led_set has two are two parameters: value and led. The user controlled LED is made to match the logic state of the “value” parameter. A value of “True” turns on the LED, and a value of “False” turns it off. The “led” parameter indicates which user LED to blink, with LED 1 being the default.
2. Turn on the “yellow” Network LED.
3. Turn off the “yellow” Network LED.
4. Turn on the “green” Network LED.
5. Turn off the “green” Network LED.

Watchdog

The watchdog feature, provided through the watchdog module, exists as a safeguard. If there are critical operations that “must” happen periodically, or else the system will be irretrievably broken, an application can request that a “watchdog” be established. If the application threads do not service their watchdog within the promised interval, the entire system reboots. You can change or, if necessary, delete the intervals for these software watchdogs. Using a software watchdog exists as a measure of last resort. Appropriate error detection and handling with Python scripts is certainly recommended.

The following sample program demonstrates the watchdog feature.

Note The highlighted numbers in the sample code correspond to the items in the Program Notes, below.

```
import watchdog                  (1)
import time

w=watchdog.Watchdog('test',20)                  (2)
for x in xrange(1,6):                   (3)
  print "Step ", x                      (4)
  time.sleep(10.0)                      (5)
  w.heartbeat()                         (6)
print "Step just before the end..."                     (7)
time.sleep(60.0)                        (8)
print "Step after the end."                     (9)
```

Program notes

1. The watchdog module includes the Watchdog class needed by the program.
2. Create a watchdog object named “test” that will expire in 20 seconds.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

3. Loop five times (1-5).
4. Indicate our iteration...
5. ... sleeping less than the timeout on each iteration, but more time than the timeout in total.
6. Reset the watchdog timer to 20 seconds each iteration, allowing all of the loops to complete.
7. Indicate that small loops are complete.
8. Sleep for an interval much longer than the timeout.
9. This print statement never executes, because the system will reboot when the watchdog timeout expires.

RCI callback

An RCI callback involves two types of actions, demonstrated in the following programs:

- Making RCI requests from Python applications.
- Extending RCI to allow Remote Manager to make requests of Python applications. This is known as an RCI callback.

The following example shows an RCI request.

Note The highlighted numbers in the sample code correspond to the items in the Program Notes, below.

```
  import rci                    (1)

  request_string="""                    (2)
<rci_request version="1.1">
  <query_state>
    <interface_info name="eth0">
      <ip/>
    </interface_info>
  </query_state>
</rci_request>
"""

print rci.process_request(request_string)                    (3)
```

Program notes

1. The rci module includes the **process_request** function needed by the program.
2. A string representing the RCI request is needed. This sample uses the Python multi-line string syntax to make it clear that the XML represents a request for the current IP address of the Ethernet interface. Combining the lines into a single string on one line would work in the same way.
3. The RCI XML is submitted for parsing, and the resulting string is returned. In this sample, the result is simply printed.

Following example shows a simple RCI callback:

```
import rci                    (1)

def cb(req):                  (2)
```


원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

```
        print "Received request: " + req                                    (3)

r=rci.RciCallback()                                  (4)
r.register_callback('test', cb)                                (5)

rci.process_request('<rci_request version="1.1"><do_command
target="test"><customxml/></do_command></rci_request>')(6)
```

Program notes

1. The RCI module includes the RciCallback class needed by the program.
2. Create a function to be called whenever a remote entity wants to communicate with this script.
3. This simple function will simply demonstrate that it received a request that could be parsed and handled however the application saw fit.
4. Create a callback object.
5. Assign the target "**test**" to the new callback object. If a remote entity issues a "**do_command**" with the target "**test**", the supplied callback function will be called.
6. This is simply an example that causes the callback to be called. This example could also have been a remote SCI query through Remote Manager.

XBee functions

For a description of the XBee module and program samples, see the ZigBee module information section in the *Digi Python Wiki Archive Reference Manual*.

XBee Gateway Python application and Remote Manager

The XBee Gateway Python application is an application that resides on XBee Gateway. It allows you to connect your XBee modules to Remote Manager, enabling them to upload data to Remote Manager and receive remote text and commands. The XBee Gateway Python application is already installed in your XBee Gateway device and automatically starts when the gateway is initialized.

For a complete description of Remote Manager, see the *Digi Remote Manager User Guide* on the Remote Manager support page.

How does the XBee Gateway Python application work?

XBee Gateway and XBee Gateway Python application software combination acts as a bridge between your XBee network and Remote Manager. This means that using the capabilities provided by Remote Manager, you can communicate with and manage not just XBee Gateway, but also all the XBee modules of the network individually. Similarly, all the XBee modules can report data to Remote Manager and store the data there to be retrieved later.

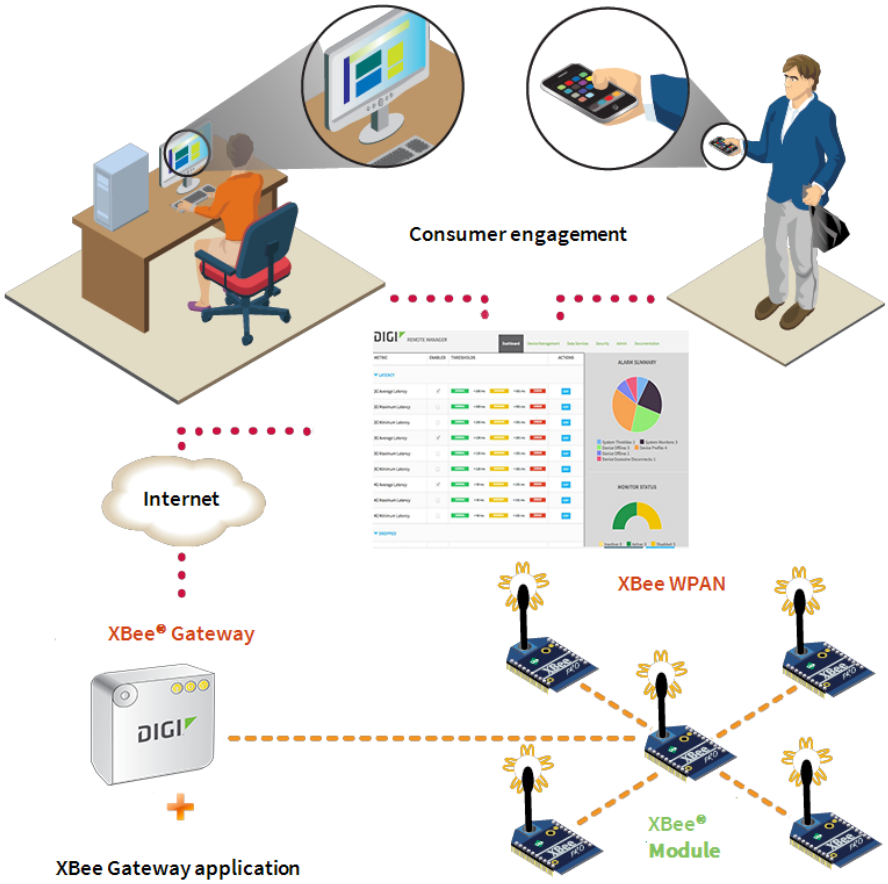
Consumer applications, such as web apps, mobile apps, and so on, can use Remote Manager web services to retrieve data stored by the XBee modules and represent it in different ways, or talk directly with any of the XBee modules to configure them, activate Digital Input/Output (DIO) lines, etc. The following figure illustrates the role of XBee Gateway and XBee Gateway Python application in such a scenario.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate. ㈜테솔 · www.tessol.com TS-TL-DGI-049 62 / 177

KOLAS 국제공인교정기관 · ISO/IEC 17025

TESSOL Technical Library TS-TL-DGI-049



XBee Gateway Python application requirements

You must complete the following requirements before you can use the XBee Gateway Python application and Remote Manager capabilities:

1. A Remote Manager account. If you do not have a Remote Manager account, follow the instructions in the create a Remote Manager account section in the *Digi Remote Manager User Guide*.
2. Your XBee Gateway device must be registered in your Remote Manager account. Follow the instructions in the register a device section in the *Digi Remote Manager User Guide*.
3. The XBee Gateway Python application must be running in your XBee Gateway device. By default, the XBee Gateway Python application is already installed and running on the XBee Gateway devices; that is, the application executes automatically when the device is initialized. Therefore, you do not have to start the application. If you uninstalled the application, use the File Management function in Remote Manager or the XBee Gateway web interface to install the XBee Gateway Python application again.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Key features and operations of the XBee Gateway Python application

The XBee Gateway Python application provides the following features:

- Automatically store status information for DIO and Analog-to-Digital Converter (ADC) lines reported by the XBee nodes of the network in Remote Manager.
- Receive serial data from Remote Manager and send it to the corresponding XBee module of the network.
- Receive serial data from an XBee node of the network and store it in Remote Manager automatically.
- Set the value of the DIO lines of any XBee module in the network through Remote Manager.

Store status data for XBee lines in Remote Manager

You can configure XBee nodes in a network to report information about the status of the DIO lines and ADC values to the coordinator or other nodes in the network. This scenario is very common when the XBee node is attached to one or more sensors to monitor a process or some environment values. In such a case, you may want to report the data from the sensor(s) to the coordinator every time a line changes its status or every period of time. Using the XBee Gateway Python application, you can automatically upload those values to Remote Manager, store them there, and retrieve the values later for use by other user applications.

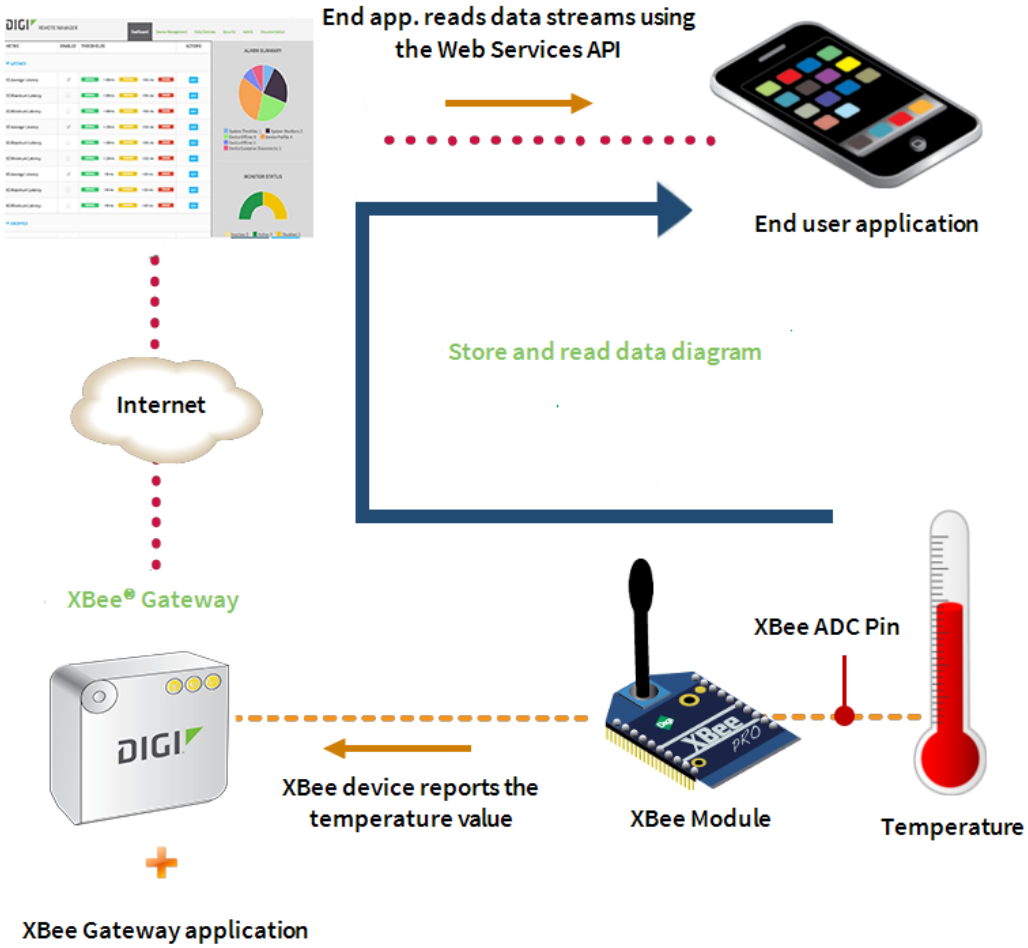
Whenever an XBee module in the network reports the status of the DIO lines and ADC values to XBee Gateway, the XBee Gateway Python application automatically handles the XBee frame containing those values, processes it, and uploads the reported values to Remote Manager. This process generates a data stream for each of the different measures reported by the XBee module. For more information about data streams are, see the *Digi Remote Manager Programmer Guide*. The following figure demonstrates the process of storing status data on Remote Manager.

Using the Remote Manager Web Services API, you can retrieve the data stream values from Remote Manager to be used in end user applications with different purposes, for example, to display a histogram or generate a database. To learn more about the Remote Manager Web Services API, see the *Digi Remote Manager Programmer Guide*.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025



Example: Configure the XBee node to report line and upload status

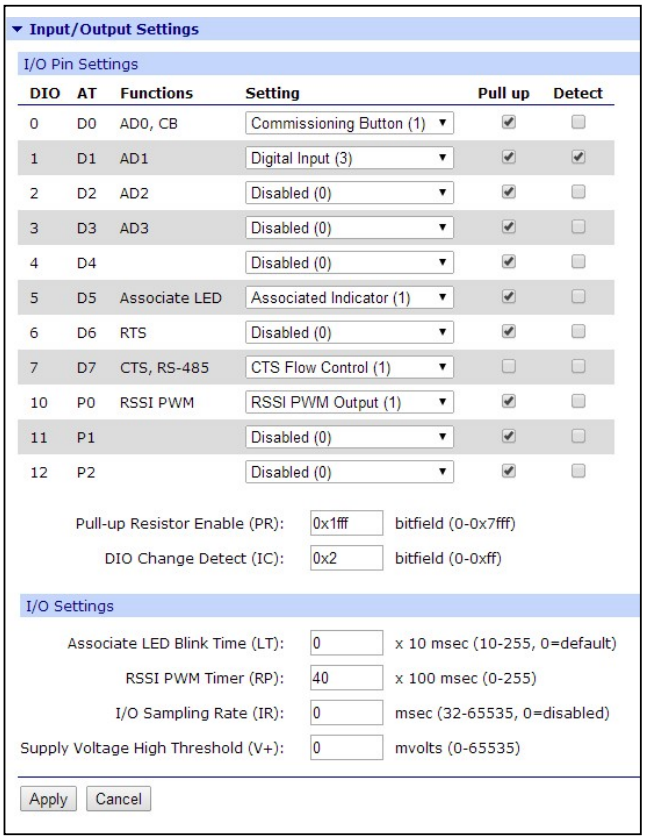
You can configure an XBee node from the network to report the status of the DIO1 each time it changes and verify that the values are uploaded to Remote Manager.

To configure XBee node to report line and upload status:

1. Ensure the XBee device you are going to configure is attached to an XBee Interface Board (XBIB). You will use the **User Button 3 (SW3)** of the XBIB to change the status of **DIO1** as it is directly connected to the **DIO1** of the module.
2. From a web browser, go to the **Home** page of your XBee Gateway web interface.
3. Under **Configuration**, click **XBee Network**. The **XBee Configuration** page appears.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

4. Click the **Discover XBee Devices** button to locate the remote XBee devices that are in the same network as XBee Gateway.
5. Click the XBee device that you want to configure.
6. From the **XBee Configuration** page, click **Input/Output Settings**.
7. Under **I/O Pin Settings**, configure **I/O Pin 1** (AT setting D1) to **Digital Input (3)** and change the value of the **DIO Change Detect (IC)** setting to **0x2**. These settings configure **DIO1** as input. Each time the value of **DIO1** changes, the XBee device sends an XBee packet to XBee Gateway with the new value of the DIO. In addition, the XBee Gateway Python application uploads the new value to Remote Manager.



8. On the XBIB, press the **User Button 3 (SW3)** several times. This action causes the XBee module report the status of **DIO1**.
9. From a web browser, log in to Remote Manager.
10. From Remote Manager, click **Data Services**. The **Data Services** page appears.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

11. Click **Data Streams**. The Data Streams view contains all the data streams, or data channels, of the devices that you have registered in your account.

    There you will find the streams generated by any XBee node from your network that reported any data. The data streams follow this pattern:

    ```
    [device_id]/[source]/[xbee_mac]{/[dio_number]}
    ```

    Where:

    - **[device_id]** Is the ID of your XBee Gateway.
    - **[source]** Is the source of the data. Legal values are:
      - **xbee.digitalIn**
      - **xbee.analog**
      - **xbee.serialIn**
    - **[xbee_mac]** Is the MAC Address of the XBee node that reported the data in the following format:

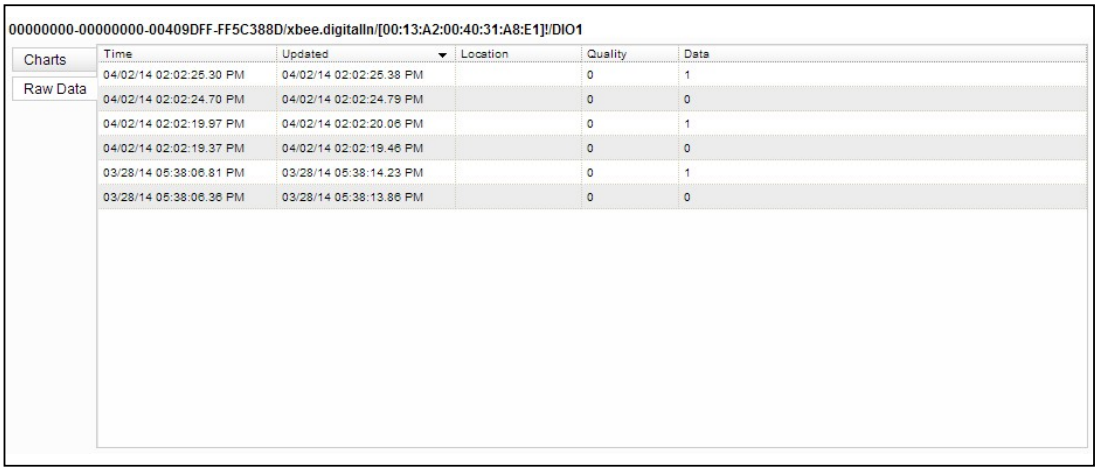
      ```
      [XX:XX:XX:XX:XX:XX:XX:XX]!
      ```

    - **[dio_number]** Is the name of the DIO that generated the data. This is only present if the [SOURCE] is **xbee.digitalIn** or **xbee.analog**.

    One of those streams should correspond to the **DIO1** of your XBee device. For example:

    ```
    00000000-00000000-00409DFF-FF5C388D/xbee.digitalIn/
    [00:13:A2:00:40:31:A8:E1]!/DIO1
    ```

12. Click the serial data stream that correspond to the **DIO1** of your XBee device. Note how the values stored have been changed between 0 and 1. For example:



Time	Updated	Location	Quality	Data
04/02/14 02:02:25.30 PM	04/02/14 02:02:25.38 PM		0	1
04/02/14 02:02:24.70 PM	04/02/14 02:02:24.79 PM		0	0
04/02/14 02:02:19.97 PM	04/02/14 02:02:20.06 PM		0	1
04/02/14 02:02:19.37 PM	04/02/14 02:02:19.46 PM		0	0
03/28/14 05:38:06.81 PM	03/28/14 05:38:14.23 PM		0	1
03/28/14 05:38:06.36 PM	03/28/14 05:38:13.86 PM		0	0

Each stream contains a historical view of the values of the data channel it represents. To display the historical values, switch from the **Table** to **Chart** view.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Receive serial data from Remote Manager

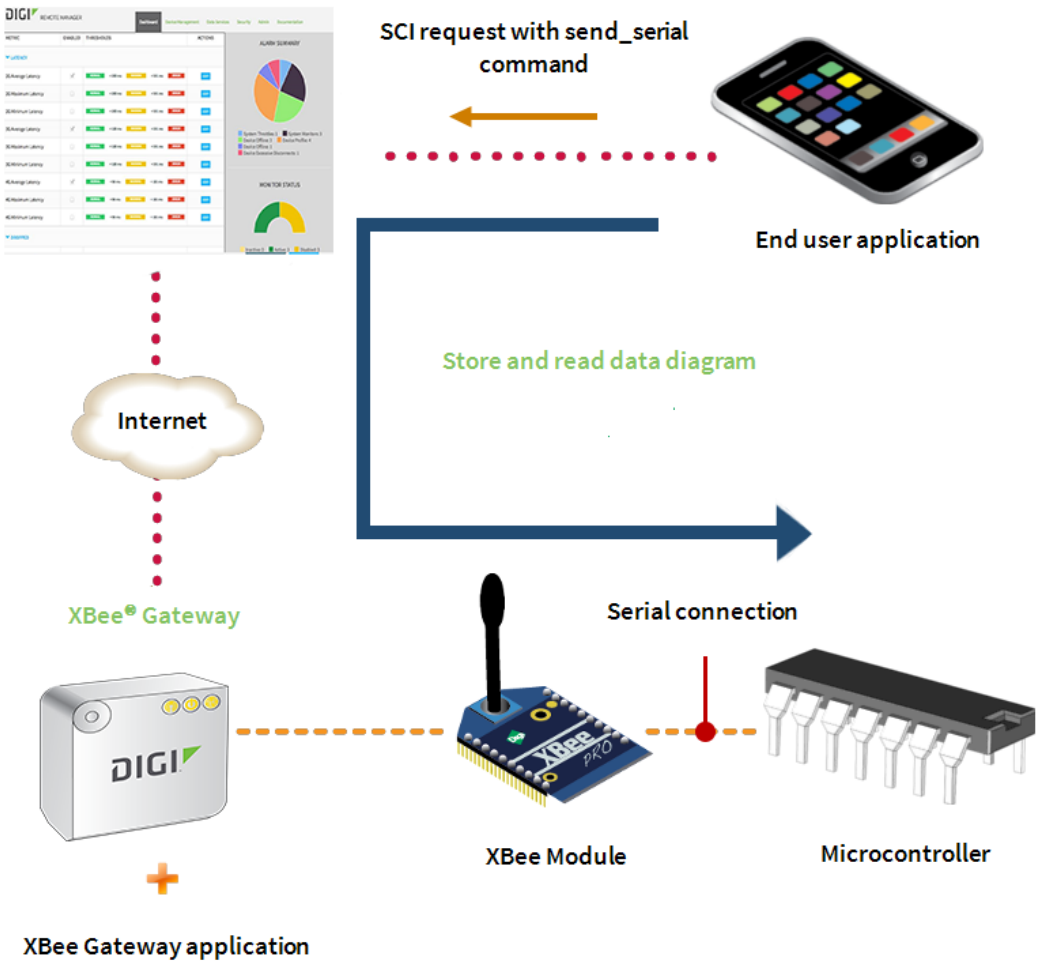
In some scenarios, you can attach an XBee module to a microcontroller that can manage the radio module, configure it, process data reported by the module, and execute actions. In those cases, the combination of XBee module and microcontroller can use a custom communications protocol transmitted wirelessly from an XBee network node to the target XBee node, and via serial from the target XBee node to the microcontroller to which it is attached.

The XBee Gateway Python application allows sending a serial data packet through Remote Manager, using the Web Services API, to a specific XBee module or all XBee modules in the network that will be transmitted through its serial interface. That serial packet can contain any data, including the custom protocol that your XBee module and microcontroller use to communicate between them. The following figure demonstrates the process for receiving serial data from Remote Manager.

To send serial data to one of the XBee nodes on your network through Remote Manager, you need to use the Remote Manager Web Services API. In this case, you need to send a **POST** command containing a Server Command Interface (SCI) request to Remote Manager. The SCI request in turn contains a Remote Command Interface (RCI) **do_command** element, with **xbgw** as target attribute and the **send_serial** command as content. To learn more about SCI requests, the RCI protocol, and the Web Services API, see the *Digi Remote Manager Programmer Guide*.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Program XBee Gateway using Python *XBee Gateway Python application and Remote Manager*



send_serial command definition

The **send_serial** command sends serial data to a specific XBee node in your network. To use this command, add it to an SCI request inside the RCI **do_command** element.

Command syntax

The send_serial command must follow this syntax:

```
<send_serial addr="{address|broadcast}" encoding={"base64"|"utf-8"}">value</send_serial>
```

Command attributes

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

- **addr**
  - **Usage**: Required.
  - **Description**: This attribute indicates the destination address of the node to which the content indicated by the command body should be transmitted.
  - **Value**: Legal values for this attribute include:

    The 64-bit IEEE address of the node following one of these patterns:

    ```
    XX:XX:XX:XX:XX:XX:XX:XX
    ```

    ```
    [XX:XX:XX:XX:XX:XX:XX:XX]!
    ```

    ```
    XXXXXXXXXXXXXXXX
    ```

    ```
    XX-XX-XX-XX-XX-XX-XX-XX
    ```

    The string **broadcast**, which transmits the string to all nodes using a broadcast packet.
- **encoding**
  - **Usage**: Optional.
  - **Description**: Specifies how the character data in the command elements is processed.
  - **Value**: The following encoding types are allowed:
    - **base64**: Use Base64 encoding. Character data is decoded during command processing prior to transmit on the RF network.
    - **utf-8**: Use UTF-8 variable-width encoding. While you can specify this encoding type, current limitations in RCI/SCI processing through Remote Manager mean that true UTF-8 encoding is not passed cleanly through all systems and end-to-end. It is only safe to use ASCII. Specifying 'utf-8' is primarily useful for evaluation only.
    - **Default value**: **base64**.

Command body (value)

The command body contains the data to be transmitted to the specified XBee node of the network. The command body content depends on the value of the encoding attribute:

- **base64**: The command body value must be encoded in base64. The XBee Gateway Python application will receive the encoded content but, prior to transmission to the corresponding XBee node, the application will decode the command body to its original content and that will be transmitted.
- **utf-8**: The command body value must be the serial data that you want to send to the XBee node. The entire content of the command body as received by the gateway Python application will be transmitted subject to whitespace handling rules of XML and the limitations of Remote Manager to represent individual code points. For best results, base64 encoding is preferred for production code and evaluation is best when limited to the ASCII subset.

Note Whitespace is not significant when the XBee Gateway Python application processes base64. However, whitespace in UTF-8 is significant, because it is impossible to determine whether the

whitespace should be considered as such and thus take the conservative approach of keeping it significant and passing it on.

Request and reply examples

- Request

  This SCI request sends a serial data command with the text **Hello, World!** encoded in base64 to the XBee node of our network corresponding to the MAC address **00:11:22:33:44:55:65:77**.

  Note The request is using a dummy device ID and XBee MAC address. You will need to use your own XBee Gateway device ID and XBee MAC address if you want to test this example.

```
<sci_request version="1.0">
  <send_message>
    <targets>
        <device id="00000000-00000000-001122FF-FF334455"/>
    </targets>
<rci_request version="1.1">
    <do_command target="xbgw">
          <send_serial addr="00:11:22:33:44:55:66:77"
                    encoding="base64"> SGVsbG8sIFdvcmxkIQ==
          </send_serial>
    </do_command>
  </rci_request>
 </send_message>
</sci_request>
```


원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

- Reply

  If the SCI request succeeds, you will receive a SCI reply containing the send_serial command response element. As it was successful, the response will be empty.

```
<sci_reply version="1.0">
  <send_message>
      <device id="00000000-00000000-001122FF-FF334455">
          <rci_reply version="1.1">
              <do_command target="xbgw">
                  <responses command="send_serial">
                      <response/>
                  </responses>
              </do_command>
          </rci_reply>
      </device>
   </send_message>
</sci_reply>
```

  If the SCI request fails, you will receive an SCI reply containing the **send_serial** command **response** element that includes an error element indicating the cause of the error. For example:

```
<sci_reply version="1.0">
    <send_message>
        <device id="00000000-00000000-001122FF-FF334455">
            <rci_reply version="1.1">
                <do_command target="xbgw">
                    <responses command="send_serial">
                        <response>
                            <error id="encoding">
                                <desc>Unrecognized encoding</desc>
                                <hint>basd64</hint>
                            </error>
                        </response>
                    </responses>
                </do_command>
            </rci_reply>
        </device>
    </send_message>
</sci_reply>
```

The **error** element contains an id attribute indicating the error identifier. For more information regarding the possible XBee Gateway Python application error identifiers, see XBee Gateway Python application command errors.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

The **desc** element displays the meaning of the error identifier, and the **hint** element provides an explanation of what caused the received error.

Example: Sending text to an XBee node through Remote Manager

The following example assumes the microcontroller attached to the XBee device is a computer.

You must install XCTU on your computer. If you do not have XCTU installed, go to www.digi.com/xctu to download and install XCTU.

To send a **Hello, World!** text to an XBee node on your network through Remote Manager:

1. Attach the XBee node from your network to an XBIB device and connect it to your computer using a serial or USB cable. This is the node that will receive the serial data.
2. Open XCTU and add the XBee node that is connected to your computer to the list of radio modules.
3. Once XCTU has started and your XBee node is added to the list, select the node and click the **Consoles working mode** tab. The Console log window appears and displays the XBee node's serial console.
4. Connect the console.
5. From a web browser, log in to Remote Manager.
6. Click **Documentation** and then click **API Explorer**. The API console appears.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

7. From the API console, select **POST HTTP Method** and write the following SCI request that includes the **send_serial** command. The **send_serial** command will be sent to the remote XBee node within the RCI **do_command** element, as follows:

```
<sci_request version="1.0">
    <send_message>
        <targets>
            <device id="{device_id}"/>
        </targets>
      <rci_request version="1.1">
         <do_command target="xbgw">
             <send_serial addr="{xbee_mac}"
                          encoding="base64">SGVsbG8sIFdvcmxkIQ==
             </send_serial>
         </do_command>
     </rci_request>
  </send_message>
</sci_request>
```

Where:

- {device_id} is the ID of your XBee Gateway device.

  {xbee_mac} is the MAC address of the XBee node that you attached to your computer.

For example:

```
<sci_request version="1.0">
    <send_message>
        <targets>
            <device id="00000000-00000000-00409dff-ff5c3BBd"/>
        </targets>
      <rci_request version="1.1">
         <do_command target="xbgw">
             <send_serial addr="0013A2004031A8E1"
                          encoding="base64">SGVsbG8sIFdvcmxkIQ==
             </send_serial>
         </do_command>
     </rci_request>
  </send_message>
</sci_request>
```

The content of the **send_serial** command is the text **Hello, World!** encoded in base64 as it is specified in the encoding attribute.

8. Click **Send**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

9. Verify in XCTU that the serial console for the XBee node that you added received the data. Depending on the operating mode (API or AT) of the XBee device, you will receive the data in one of the following modes:
   - **AT mode**: You will see the text **Hello, World!** in the console.
   - **API mode**: You will receive a Receive Packet API frame with the Hello World! text (HEX values of the ASCII characters) in the Received data field of the frame.

Store serial data in Remote Manager

As explained in Receive serial data from Remote Manager, when your XBee device is connected to a microcontroller and you want to send serial data to it, you can do so through Remote Manager by using the Web Services API and the send_serial command. The XBee Gateway Python application stores serial data sent from the microcontroller to the XBee Gateway device and from the XBee Gateway device to XBee Gateway running the XBee Gateway Python application.

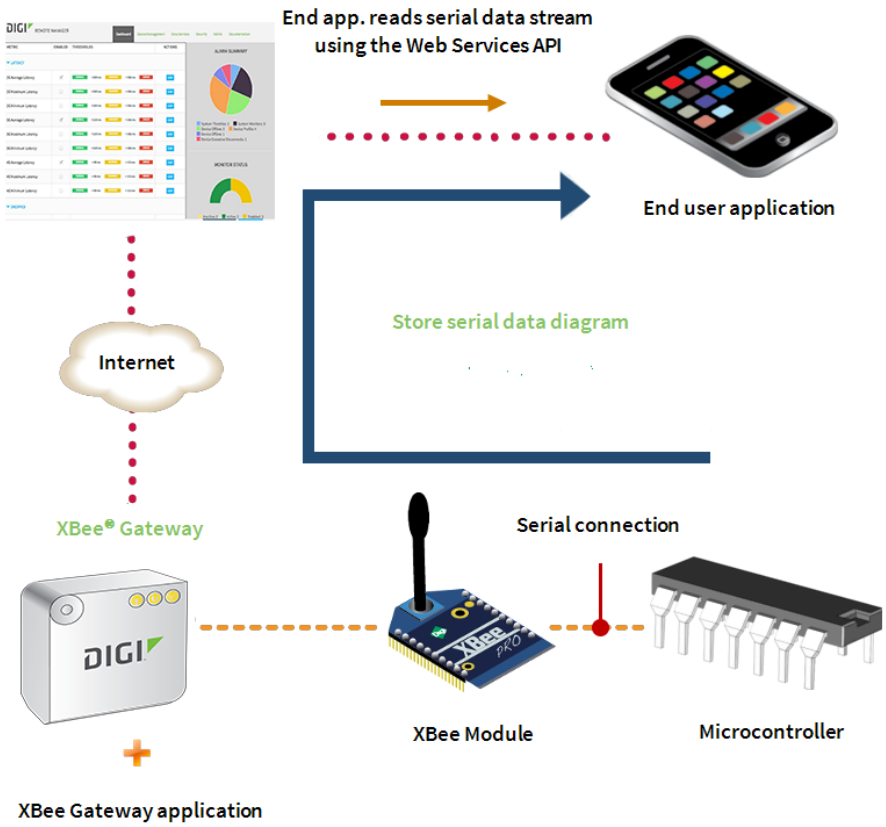
Store serial data in Remote Manager when you want to:

- Track an event that happened in the microcontroller.
- Track the measurements that are managed by the microcontroller.
- Store commands or serial data generated by the microcontroller in Remote Manager.

End-user applications can retrieve the serial data from Remote Manager later to perform some tasks.

Whenever an XBee module on the network sends any kind of serial data to XBee Gateway, the XBee Gateway Python application automatically processes the frame containing the serial data and uploads it to Remote Manager, thereby generating a data stream. To learn more about data streams, see the *Digi Remote Manager User Guide* and *Digi Remote Manager Programmer Guide*.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.



Using the Remote Manager Web Services API, you can retrieve the serial data values from Remote Manager. End user applications can use the serial data for different purposes. For example:

- Display a list of events
- Perform a specific task

To learn more about the Remote Manager Web Services API, see the *Digi Remote Manager Programmer Guide*.

By default, the serial data is stored in Remote Manager and encoded in base64 format. The reason behind this is that white spaces are not correctly handled by Remote Manager at the moment. The XBee Gateway Python application has a configuration file containing the settings of the application. One of those settings is the encoding of the serial data prior to store it in Remote Manager.

To change the setting to store the data in UTF-8 format:

1. Open /WEB/python/xbgw_settings.json in an editor.
2. Change **"encode serial": true** to **"encode serial": false**.

See XBee Gateway Python application configuration file for more information on the configuration file.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Example: Send serial data from an XBee node to XBee Gateway

The following example assumes the microcontroller attached to the XBee device is a computer.

To send a serial data package from an XBee node on your network to XBee Gateway and verify that it has been automatically uploaded to Remote Manager:

1. Attach one XBee node from your network to an XBIB device and connect it to your computer using a serial or USB cable. This is the node that will send the serial data to XBee Gateway.
2. Open XCTU. Add the XBee node that is connected to your computer to the list of radio modules.
3. Once XCTU has started and your XBee node is added to the list, select the node and click the **Consoles working mode** tab. The Console log window appears and displays the XBee node's serial console.
4. Connect the console.
5. Depending on the working mode (API or AT) of the XBee device, choose one of the following options.
   - **AT mode**:
     a. Click the **Add new packet** button and paste the following text in the dialog:

     ```
     Hello, World!
     ```

     b. Once the packet is added to the list of packets, select it and click the **Send selected packet** button.
   - **API mode**:
     a. Click the **Add new frame** button.
     b. Paste the following text in the dialog:

     ```
     7E 00 1B 10 01 00 00 00 00 00 00 00 00 FF FE 00 00 48 65 6C
     6C 6F 2C 20 57 6F 72 6C 64 21 88
     ```

     The previous text is a **Transmit Request** frame. You can also generate it by yourself by clicking the **Edit** frame using the **Frames Generator** tool button:

     c. After adding the frame to the list of frames, select the frame and click the **Send selected frame** button.
6. From a web browser, log in to Remote Manager.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

7. Click **Data Services** and then click **Data Streams**. The Data Streams page appears and displays all the data streams (data channels) by the XBee nodes that are registered to your account on your network that reported data. The streams follow this pattern:

```
[device_id]/[source]/[xbee_mac]{/[dio_number]}
```

Where:

- **[device_id]** Is the ID of your XBee Gateway.
- **[source]** Is the source of the data. Legal values are:
  - **xbee.digitalIn**
  - **xbee.analog**
  - **xbee.serialIn**
- **[xbee_mac]** Is the MAC Address of the XBee node that reported the data in the following format:

```
[XX:XX:XX:XX:XX:XX:XX:XX]!
```

- **[dio_number]** Is the name of the DIO that generated the data. This is only present if the [SOURCE] is xbee.digitalIn or xbee.analog.

  One of the streams displayed should correspond to the serial data of your XBee device. For example:

```
00000000-00000000-00409DFF-FF5C388D/xbee.serialIn/
[00:13:A2:00:40:31:A8:E1]!
```

  Click that serial data stream. Observe how the latest serial data value corresponds to the following text:

```
SGVsbG8sIFdvcmxkIQ==
```

  This serial data value is **Hello, World!** encoded in base64.

Manage XBee DIO lines though Remote Manager

The XBee Gateway Python application allows you to remotely manage the DIO lines of any of the XBee nodes on your network through Remote Manager. Use this application feature to turn on/off different actuators.

The XBee Gateway Python application can receive digital output commands sent through Remote Manager (using the Web Services API) and dispatch them to a specific XBee module in the network to set its corresponding pin high or low.

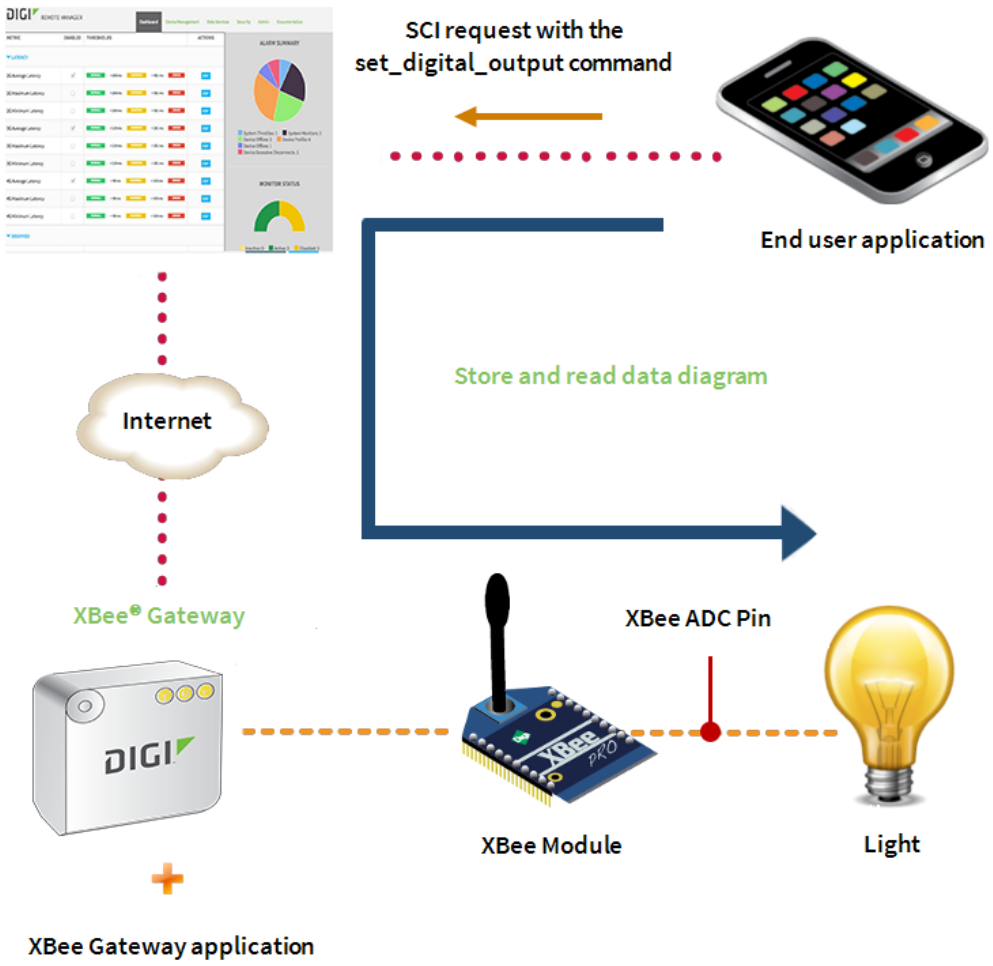
The following figure demonstrates how this remote management mechanism works.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Program XBee Gateway using Python *XBee Gateway Python application and Remote Manager*



To set the value of a DIO pin of one XBee node on your network through Remote Manager, you need to use the Remote Manager Web Services API.

In this case, you will need to send a **POST** command, containing a Server Command Interface (SCI) request to Remote Manager. The SCI command in turn contains a Remote Command Interface (RCI) **do_command** element with **xbgw** as target attribute and the **set_digital_output** command as content.

If you never worked with Remote Manager Web Services API before, see the *Digi Remote Manager Programmer Guide* to learn more about SCI requests and RCI protocol.

set_digital_output command definition

The **set_digital_output** command configures the value of a DIO of a specific XBee node in your network. Add this command to the SCI request inside the RCI do_command element.

Command syntax

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

The **set_digital_output** command must follow this syntax:

```
<set_digital_output addr="address" index="index">value</set_digital_output>
```

Command attributes

- **addr**
  - **Usage**: Required.
  - **Description**: This attribute indicates the destination address of the node to which the content indicated by the command body should be transmitted. This address is expressed as the 64-bit IEEE address of the node.
  - **Value**: The 64-bit IEEE address of the node following one of these patterns:

    ```
    XX:XX:XX:XX:XX:XX:XX:XX
    ```

    ```
    [XX:XX:XX:XX:XX:XX:XX:XX]!
    ```

    ```
    XXXXXXXXXXXXXXXX
    ```

    ```
    XX-XX-XX-XX-XX-XX-XX-XX
    ```

- **index**
  - **Usage**: Required if the name attribute is not specified.
  - **Description**: This is the pin index for which settings are being changed.
  - **Value**: The value for this attribute must represent a valid integer between 0 and 12.

    Indices **0-9** map to DIO values. That is, they set the **Dx** AT parameter, where ***x*** is the index. For example, index 8 is equivalent to setting D8; index 12 is equivalent to setting P2.

    Indices **10-12** map to PWM values. That is, they set the **Px** AT parameter, where ***x*** is index-10.

- **name**
  - **Usage**: Required if index attribute is not specified.
  - **Description**: The name of the pin for which settings are being changed.
  - **Value**: Specify either the AT parameter corresponding to that pin (from D0 to D9) or the functional name of the pin (from DIO0 to DIO12) as the value for this attribute.

Note Currently, **set_digital_output** supports setting pins on remote ZigBee nodes only. This means that pin index 9 is invalid, because DIO9 is not user-configurable on such nodes. Future updates to this command may open up the possibility to change this behavior; for example, for 802.15.4 nodes.

Command body (value)

The body of the **set_digital_output** command indicates whether to set the digital output pin low or high. Legal values for the body to configure the pin are:

- **high** or **true**: Sets the pin high (ON). Other legal values include:

  1, yes, y, on

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 80 / 177

- **low** or **false**: Sets the pin low (OFF). Other legal values include:

  0, no, n, off

Request and reply examples

- **Request**

  This SCI request example configures DIO4 of the XBee node corresponding to the MAC address **00:13:a2:00:40:9f:6f:cb** to **high**. The command uses the attribute index to indicate the pin to be configured instead of the name one:

```
<sci_request version="1.0">
    <send_message>
        <targets>
            <device id="00000000-00000000-00409DFF-FF5C4C66"/>
        </targets>
        <rci_request version="1.1">
            <do_command target="xbgw">
                <set_digital_output addr="00:13:a2:00:40:9f:6f:cb"
index="4">1</set_digital_output>
            </do_command>
        </rci_request>
    </send_message>
</sci_request>
```

Note This example request uses a dummy device ID and XBee MAC address. You must use your own XBee Gateway device ID and XBee MAC address to test this example.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

- **Reply**

```
<sci_request version="1.0">
    <send_message>
        <device id="00000000-00000000-00409DFF-FF5C4C66"/>
             <rci_reply version="1.1">
                 <do_command target="xbgw">
                      <responses command="set_digital_output">
                          <response/>
                      </responses>
                 </do_command>>
             </rci_reply>
         </device>
     </send_message>
</sci_reply>
```

If the SCI request fails, you will receive an SCI reply containing the **set_digital_output** command response element that includes an **error** element indicating the cause of the error. For example:

```
<sci_reply version="1.0">
    <send_message>
        <device id="00000000-00000000-00409DFF-FF5C4C66">
            <rci_reply version="1.1">
                <do_command target="xbgw">
                    <responses command="set_digital_output">
                        <response>
                            <error id="invalidattr">
                                <desc>Attribute value is incorrect</desc>
                                <hint>DIO9 cannot be configured for
digital.</hint>
                            </error>
                        </response>
                    </responses>
                </do_command>
            </rci_reply>
        </device>
    </send_message>
</sci_reply>
```

The **error** element contains an **id** attribute indicating the error identifier. For more information regarding the possible XBee Gateway Python application error identifiers, see XBee Gateway Python application command errors.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

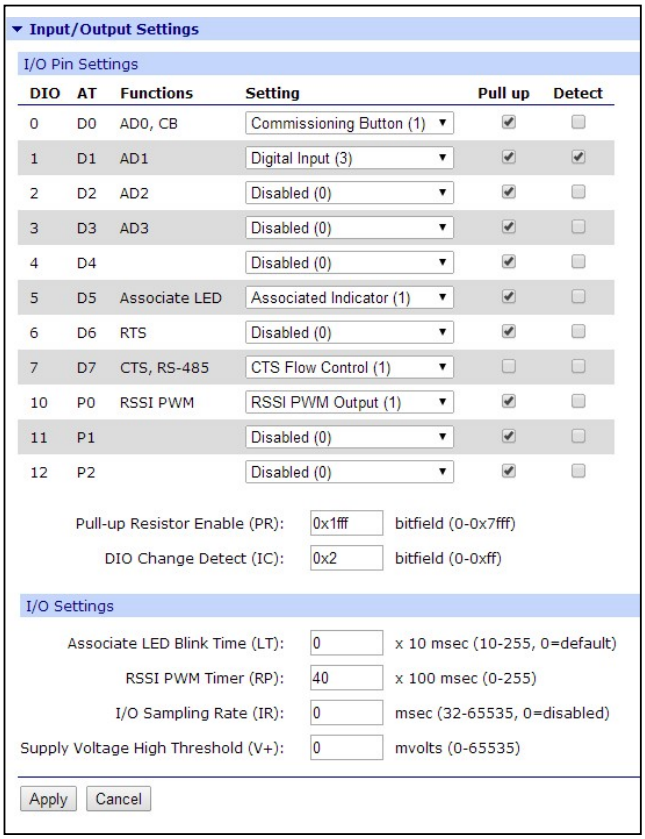
we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

The **desc** element displays the meaning of the error identifier. The **hint** element provides an explanation with the cause of the received error.

Example: Turn on an LED on the XBee interface board

To turn on the User LED 4 (DS4) of the XBee Interface Board (XBIB):

1. Ensure the XBee node you are going to configure is attached to an XBIB device. You will change the status of the User LED 4 (DS4) of the board by modifying the value of the DIO4 of the XBee node because they are connected each other.
2. From a web browser, go to the **Home** page of your XBee Gateway web interface.
3. Under **Configuration**, click **XBee Network**. The **XBee Configuration** page appears.
4. Click the **Discover XBee Devices** button to locate the remote XBee devices that are in the same network as XBee Gateway.
5. Click the XBee device that you want to configure.
6. From the **XBee Configuration** page, click **Input/Output Settings**.
7. Under **I/O Pin Settings**, configure **I/O Pin 4** (AT setting **D1**) to **Digital Output High (5)**. This way, the **DIO4** is configured as output and its value is set to high turning the **User LED 4 (DS4) OFF** because the LED in the board is using an inverted logic.



원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

8. From a web browser, log in to Remote Manager.
9. Click **Documentation** and then click **API Explorer**. API console appears.
10. From the API console, select **POST HTTP Method** and write the following SCI request that includes the **set_digital_output** command. The **set_digital_output** command will be sent to the remote XBee node within the RCI **do_command** element, as follows:

```
<sci_request version="1.0">
    <send_message>
        <targets>
            <device id="{device_id}"/>
        </targets>
      <rci_request version="1.1">
         <do_command target="xbgw">
             <set_digital_output addr="{xbee_mac}" name="DIO4">low</set_
digital_output>
         </do_command>
     </rci_request>
  </send_message>
</sci_request>
```

Where:

- **{device_id}** is the ID of your XBee Gateway device.
- **{xbee_mac}** is the MAC address of the XBee node that you attached to your computer.

For example:

```
<sci_request version="1.0">
    <send_message>
        <targets>
            <device id="00000000-00000000-00409dff-ff5c3BBd"/>
        </targets>
      <rci_request version="1.1">
         <do_command target="xbgw">
             <set_digital_output addr="0013A2004031A8E1"
                        name="DIO4">low</set_digital_output>
         </do_command>
     </rci_request>
  </send_message>
</sci_request>
```

The **set_digital_output** command sets the value of the **DIO4** to **low**, which will turn **ON** the **User LED 4 (DS4)** of the board.

11. Click **Send**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

12. Verify that the **User LED 4 (DS4)** on the XBIB board is now **ON**.
13. Now try to turn the LED off by sending the same request, but changing the value of the **set_digital_output** command to **high**.

XBee Gateway Python application configuration file

You can configure some of the XBee Gateway Python application features using a configuration file. This configuration file is placed at the same level as the application itself within the file system and its content is written in JSON format. The file has the following structure:

```
{
     category 1: {
          setting 1: value 1
          setting 2: value 2
          ...
          setting n: value n
    }
     category 2: {
          setting 1: value 1
          setting 2: value 2
          ...
         setting n: value n

     ...
     category n: {
          setting 1: value 1
          setting 2: value 2
          ...
          setting n: value n
    }
}
```

The first level of the settings structure in this configuration file is the name of the category to which the settings contained inside belongs. The second level of the structure is the list of settings contained in the category.

The contents of this configuration file are:

```
{
     "devicecloud": {
          "encode serial": true
     }
}
```

The XBee Gateway Python application provides the following category, with one configurable setting:

- **devicecloud**
  - encode serial:
    - **Type**: Boolean
    - **Description**: Indicates whether or not the serial data that is sent and stored in Remote Manager is encoded in base64.
    - **Default value**: true

Change XBee Gateway Python application settings

To change any XBee Gateway Python application setting:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

1. Open a web browser and access the Home page of your XBee Gateway web interface.
2. Click **File Management** under **Administration**.
3. Download the file **xbgw_settings.json**.
4. Using a text editor, open the **xbgw_settings.json** file and modify the settings that you want to change.
5. Return to the **File Management** page for XBee Gateway and upload the **xbgw_settings.json** file to XBee Gateway.
6. Reboot your XBee Gateway device. Your changes to the XBee Gateway Python application settings go into effect when the XBee Gateway device is initialized.

XBee Gateway Python application command errors

When you use the Web Service API from Remote Manager to send the commands provided by the XBee Gateway Python application, you may receive an error with an identifier. The following list displays all possible errors that may appear when sending commands to XBee Gateway Python application.

These errors do not generally appear during in normal operation. When **setfailed**, **txfailed**, or **txfull** appears, the most likely cause is network issues. These errors typically appear when you issue a command incorrectly.

ID	Description
address	Invalid address
encoding	Unrecognized encoding
badoutput	Invalid digital output value
base64	Unable to decode as base64
invalidattr	Attribute value is incorrect
missingattr	Missing required command attribute
toomanyattrs	Too many attributes were given
setfailed	Remote node rejected set command
txfailed	Transmit operation failed
txfull	Too many outstanding transmits
txstatus	TX Status delivery failure
unexpected	Unexpected/unclassified error

Configure a Python application in the web interface

The web interface of the XBee Gateway device includes a section that allows you to configure and manage the Python processes or applications running in the device.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Before you configure a Python application, the Python application must be loaded on the XBee Gateway device. See File management for more information on loading files on an XBee Gateway device.

To configure a Python application for an XBee Gateway device:

1. Access and log into the web interface.
2. Under **Configuration**, click **Python**. The Python Configuration page appears and displays the list of Python processes or applications that are currently configured in XBee Gateway as well as their status and the action that will be executed when the applications exit. Note that the first time you load this page, the list will be empty.
3. Select the **Enable** check box associated with the Python application. When enabled, the Python application starts immediately after your changes are saved. By selecting the **Enable** check box, the Python application also automatically starts after a system starts up.

   A green icon will appear in the Active column when a Python application is running. Note that you can stop a configured Python application immediately by clearing the **Enable** check box and clicking **Apply**.
4. Click **Apply** to save your changes.

Digi ESP for Python

Digi ESP™ for Python supports XBee Gateway. Digi ESP is an IDE featuring device detection, debugging, compiling, and downloading of Device Integration Application (DIA)/Python code to Digi gateways. Digi ESP includes example applications that can demonstrate the use of some of Digi's proprietary Python extensions, serving as templates for applications seeking to incorporate common functionality.

- For examples of how to use Digi ESP for Python with XBee Gateway, see Access the program samples in Digi ESP.
- For Digi ESP for Python installation instructions, see Install the Digi ESP for Python Development Environment.

Access the program samples in Digi ESP

Digi ESP for Python provides samples to use as a base for programming XBee Gateway, including specific examples for exercising specific interfaces available on XBee Gateway. You can access these program samples from the Python or DIA samples wizard.

To access the program samples in Digi ESP:

1. From Digi ESP, go to **File** > **New** > **Digi Python Application Sample Project** or **File** > **New** > **DIA Sample Project**. The sample wizard for Python or DIA appears.
2. Select the **Show only samples compatible with platform** check box and then select **XBee Gateway** from the combo box. The compatible samples appear in the **Sample projects** list.
3. Select the samples you want to display or click **Select All** to select all of the samples.
4. Click **Next**. The Remote device selection page appears.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 87 / 177

5. Specify the XBee Gateway device you want to use.
   - Select **Use Current Remote Device** to use the device that is currently active in Remote Manager.
   - Select **Select Specific Remote Device** to display a list of devices and select a device from the list.
6. Click **Next** to complete the process.

Install the Digi ESP for Python Development Environment

The Digi ESP for Python Development Environment is an Eclipse-based Integrated Development Environment (IDE) that simplifies the process of creating Python applications for XBee Gateway. It also provides many example projects.

To download and install the Digi ESP for Python Development Environment:

1. Navigate to the Digi XBee Gateway product support page.
2. Click the **Product Support > Drivers** link or scroll down the page to the **Drivers** section.
3. Click the **Digi ESP for Python - Windows XP/Vista/Windows 7 installer** link to download the Digi ESP for Python Development Environment.

   Note While MAC operating systems are supported, this procedure shows how to install Digi ESP for Python on a Windows operating system. If you are using a MAC operator system, click the **Digi ESP for Python - MAC OS X (10.6) installer** link.

4. Once the Digi ESP for Python framework has been downloaded, run the **Digi ESP for Python framework installation** wizard.
   a. Follow the steps in the wizard to complete the installation process.
   b. In the **Choose Components** dialog, select **Digi ESP for Python**.
   c. On the last page of the wizard, several prompts are displayed. Select **Show Release Notes** to open and view the Release Notes for the Digi ESP for Python framework.
   d. Click **Finish** to close the installation wizard. The installation process installs Digi ESP in this program group:

   Digi > Python > Dev Tools > Digi ESP for Python
5. The Digi ESP for Python framework will launch automatically. A prompt to select a workspace directory is displayed. This 'workspace' is the directory where projects and configurations will be stored. The default location is a sub-folder called workspace on the user home directory, for example:

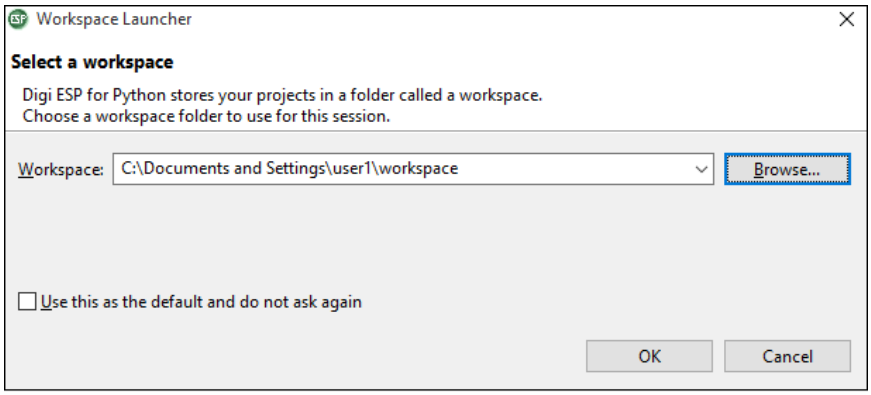
   c:/Documents and Settings/[*username*]/workspace

   Use the default workspace directory, or click **Browse** and navigate to your desired alternate workspace location, select **Use this as the default and do not ask again**, and click **OK**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

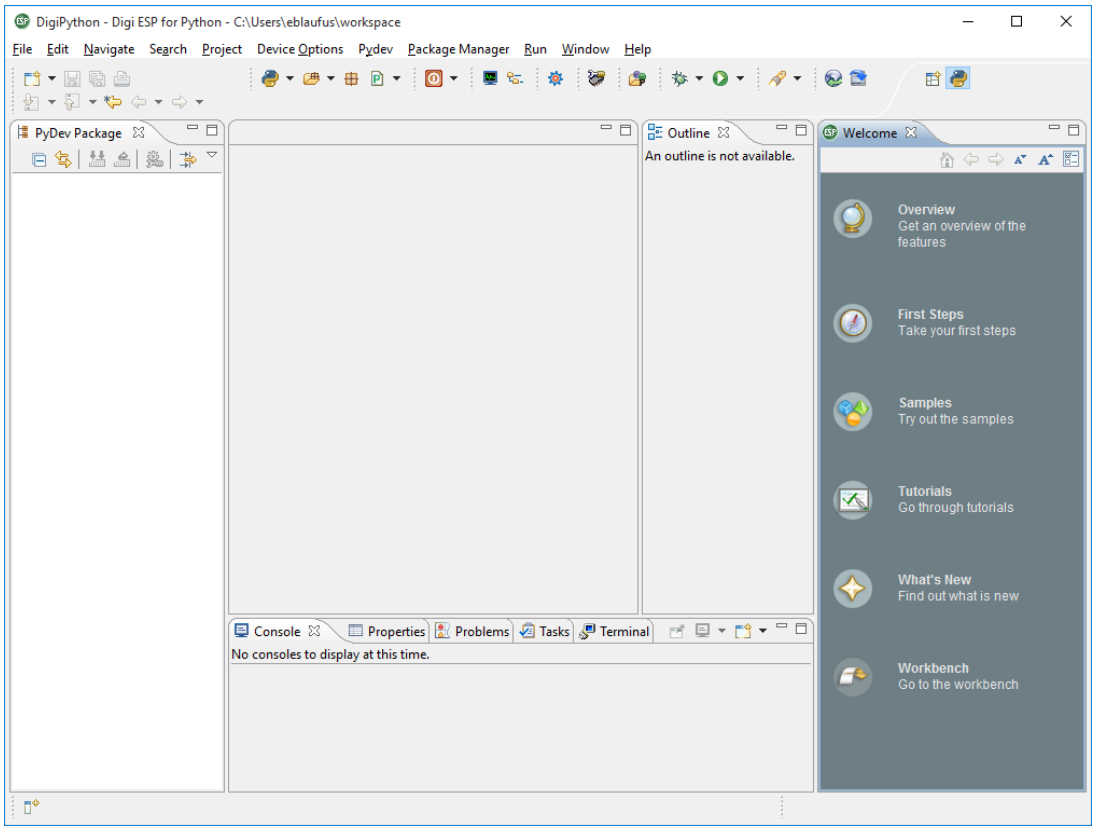
we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 88 / 177



6. The first time you run Digi ESP for Python, the **Workbench** displays.

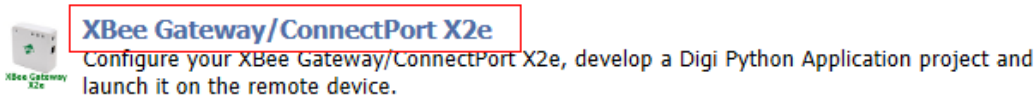
   Before the Workbench displays, the **Welcome** page displays for just a moment, and then displays along the right side of the Workbench screen. Most of the time, the **Welcome** page is minimized. When minimized, select **Help > Welcome** from the main menu to maximize the **Welcome** page.

   In the **Welcome** page, click the **Workbench** icon to display the **Workbench** screen.



7. You can display an overview for Digi ESP for Python.
   a. Select **Help > Welcome** from the main menu. The **Welcome** page appears.
   b. In the **Welcome** tab, click the **Overview** icon. The **Overview** page appears.

   c. On the overview page, click **Getting Started**. The *Digi ESP for Python Getting Started Guide* is displayed in the **Help - Digi ESP for Python** window.
8. Scroll to and click the **XBee Gateway/ConnectPort X2e** link.



9. Follow the **XBee Gateway/ConnectPort X2e** getting started instructions to build your first application using Digi ESP for Python.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

DIA software

The Digi ESP development environment includes Device Integration Application (DIA) software. DIA software is another advanced programming tool for developing custom programs for XBee Gateway. DIA software simplifies connecting remote devices and sensors to Digi gateway products by providing ready-to-use software. DIA is targeted for applications that need to gather samples of data from a set of devices, such as ZigBee sensors and wired industrial equipment. The Digi gateways can use the DIA framework to gather data from XBee sensor networks, transform the data into a useful form, and push the data to Remote Manager for consumption by a user.

DIA allows developers to focus efforts on proprietary logic, and includes a comprehensive library of ready-to-use modules for common operations and abstractions for components like:

- Interface handling (drivers)
- Data management (channels)
- Data delivery (presentations)

Written in the Python programming language for use on Digi devices, you can extend it to meet unique device connectivity requirements. When used with the Digi ESP for Python, DIA can shrink the development cycle for complex data gathering and transformation applications.

For more information on DIA software, see the DIA section in the *Digi Python Wiki Archive Reference Manual*.

Linux command shell (command line interface)

XBee Gateway has a Linux shell command line interface, which allows you to experiment with the Python interpreter interactively, create scripts, launch scripts, and control the script operation. While Digi ESP for Python is intended as the main programming interface, you may find this interface useful for some programming and device management tasks.

A shell is a program that takes commands from the keyboard and gives them to the operating system to perform. On XBee Gateway, a program called **ash** acts as the shell program. You can use this shell in several useful instances, particularly in managing files, executing Python programs, and programming and executing commands to the XBee RF module in the gateway.

Note For more information on the ash shell, go to the following website: http://linux.die.net/man/1/ash. Note that the ash shell supported in XBee Gateway is similar, but not identical, to the ash shell described in this website.

User name and password for the Linux command shell

The command line interface is accessed using SSH and is described in the Linux command shell (command line interface). Access to XBee Gateway is at the user level.

- **User name**: **python**
- **Password**: The unique, default password is printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.

Connect and log in to the XBee Gateway device

To connect and log in to the XBee Gateway device through the command line interface:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 91 / 177

Program XBee Gateway using Python *Linux command shell (command line interface)*

1. Open a command prompt or terminal window, such as one provided by PuTTY. You can download PuTTY from http://www.putty.org/.
2. Choose one of the following option:
   - From Windows, type:

     ```
     putty python@my_ip_address
     ```

   - From Linux, type:

     ```
     $ ssh python@my_ip_address
     ```

     Where ***my_ip_address*** is the IP address of XBee Gateway.
3. You are prompted for the password. The unique, default password is printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.

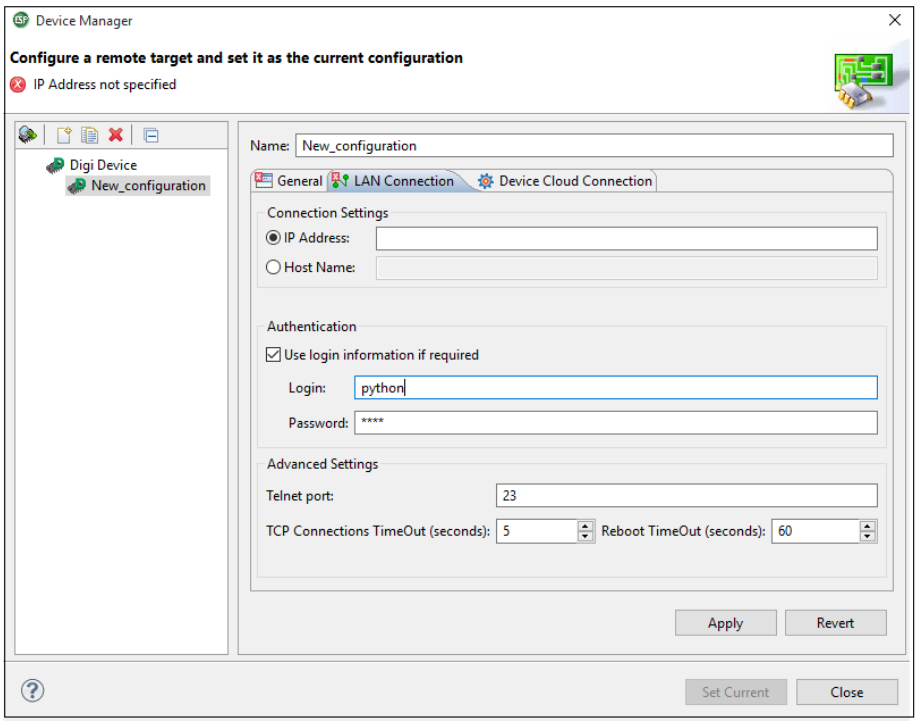
Log in to XBee Gateway through the Digi ESP for Python command line interface

Within Digi ESP for Python, there is a separate login on the **Device Manager LAN Connection** tab in Digi ESP for Python.

1. Access Digi ESP for Python.
2. Click the **Device Manager** icon in the toolbar.
3. Select **Digi Device > New_configuration** from the left pane.
4. Click the **LAN Connection** tab.
5. Perform authentication.
   a. Select the **User login information if required** option.
   b. In the **Login** field, enter the default user name: **python**
   c. In the **Password** field, enter the unique, default password, which is printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.
6. Click **Apply** to start the validation process.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Program XBee Gateway using Python *Linux command shell (command line interface)*



원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Configure XBee Gateway

XBee Gateway is designed to allow network communication with minimal configuration. However, there are several configuration settings that you can adjust. This section covers the configuration of these settings from Remote Manager and the XBee Gateway web interface.

After you configure XBee Gateway device, back up the configuration settings. See Back up or restore the configuration for more information.

XBee Gateway uses the following configurable settings to start up the XBee Gateway device and initiate communication.

Configure settings from Remote Manager 95
Configure settings from the XBee Gateway web interface 96
Ethernet IP network settings 98
Wireless (Wi-Fi) network settings 101
Mobile connectivity settings 104
Digi Mobile SureLink™ settings 112
DNS settings 115
Mobile firewall settings 116
Autostart settings for the Python Program 116
Button service assignments settings 117
Configure Remote Manager connectivity settings 120
Network services settings 131
GPS static position settings 133
Time settings 134

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

In addition to the methods described in this section, you can perform configuration programmatically, through Web Services, and natively using Python modules. See About programming for more information.

Configure settings from Remote Manager

In Remote Manager, you can configure XBee Gateway device settings, such as network connection, failover, and time settings. You can also monitor and manage XBee Gateway device data.

Basic information about Remote Manager is in the *Digi Remote Manager User Guide*.

Before you can configure settings in Remote Manager, you must perform these prerequisites:

1. Set up a Remote Manager account. See Create a new account for instructions.
2. Log in to the Remote Manager account. See Log in to your Remote Manager account for instructions.
3. Add XBee Gateway devices to the Remote Manager device list. See Add devices to your inventory for instructions.

See Remote Manager interface for more basic information about Remote Manager.

Basic configuration settings

In Remote Manager, you can access basic configuration settings for XBee Gateway by double-clicking on a device in the device list to display the **Properties** page. As an alternative, you can right-click on a device and select the **Properties** option.

Some of the basic configuration settings located in this menu are:

- Ethernet IP network settings
- Mobile connectivity settings (for Cellular models only)
- Digi Mobile SureLink™ settings (for Cellular models only)
- DNS settings
- Mobile firewall settings (for Cellular models only)
- Autostart settings for the Python Program
- File Management page in Remote Manager

Advanced configuration settings

You can access advanced configuration settings for XBee Gateway by double-clicking on a device in the device list to display the **Properties** page, and then selecting **Advanced Configuration**.

The settings available in this menu vary by model. Some of the settings are:

- Network services settings (for Cellular models only)
- Button service assignments settings
- Time settings
- Configure Remote Manager connectivity settings
- GPS static position settings
- Configure network failover
- Configure XBee network settings

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 95 / 177

Configure settings from the XBee Gateway web interface

The XBee Gateway web interface allows you to configure critical network configuration settings and other features. If you already know the IP address for the XBee Gateway device, you can open a web browser and type the IP address in the address bar to open the XBee Gateway web interface. If you do not know the IP address for the XBee Gateway device, you can use the Digi Device Discovery utility to locate XBee Gateway on your network.

The XBee Gateway web interface does not display every device setting. For more extensive access to settings, use Remote Manager or a programmatic interface.

Access the XBee Gateway web interface

To access the XBee Gateway web interface, choose one of the following options:

If you know the XBee Gateway device's IP address

1. Open a web browser, type the IP address in the address bar, and press the **Enter** key. For example: **http://10.101.1.178**.
2. The first time you attempt to access the XBee Gateway, a certificate management prompt appears. Click **Proceed Anyway** or **Advanced** > **Proceed Anyway**.
3. A login screen appears. Enter the default user name and password:
   - **User name**: **python**
   - **Password**: The unique password printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.
4. The XBee Gateway web interface appears.

If you do not know the XBee Gateway device's IP address

If you already ran the Wireless Access Point wizard, you need the Digi Device Discovery Utility to rediscover the device and open its web interface.

1. From a web browser, go to the Product Support Download page and click the **Diagnostics, Utilities & MIBs link from the Support Downloads** section.
2. Select your product from the list, or a enter keywords to locate it.
3. Select your operating system from the drop-down list, then select the **Device Discovery Utility**.
4. Follow the prompts to complete the installation of the Digi Device Discovery Utility.
5. To open the Digi Device Discovery on your computer, select **Start** > **Digi** > **Digi Device Discovery > Digi Device Discovery**. The Digi Device Discovery window appears.
6. Locate your XBee Gateway in the list of devices by matching the **Serial Number** on the XBee Gateway's label to the corresponding value in the **MAC address** column in the **Digi Device Discovery** window.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

7. Double-click the device to open the XBee Gateway web interface, or select the device and click **Open web interface** under **Device tasks** in the Digi Device Discovery window.
8. A login screen appears. Enter the default user name and password:
   - **User name**: python
   - **Password**: The unique password printed on the device label. If the password is not on the device label, the default password is **dbps**. If these defaults do not work, the password may have been updated. Contact your system administrator for help.
9. To change a subset of configuration settings through Digi Device Discovery, click the **Configure Network Settings** button. When you change configuration settings, you are prompted for a password. Leave the **Password** field blank and click **OK**.

Note If your firmware version is 3.2.30.x or later, the Digi Device Discovery tool is by default not allowed to change configuration of the XBee Gateway device. ADDP must have the **Read-Write** mode enabled in order for the button on the XBee Gateway device to control this feature. See Network services settings.

Home page

The Home page appears by default when you access the web interface for a Digi device. The information listed on this page may vary based on product and supported features.

Home page section	Description
Device Information	The **Device Information** section of the Home page summarizes current system parameters and network connectivity status.
Network Connectivity Status LED	The **Network Connectivity Status LED** and displayed information indicates the readiness of XBee Gateway to communicate in a network and with the Remote Manager server. See XBee Gateway LEDs descriptions for descriptions of the status LEDs and the various network connectivity status conditions listed.
Refresh button	Clicking **Refresh** to update the Home page. This refresh operation is necessary because items like system time and network connectivity status are not dynamically updated when the state changes on the device. This refresh operation also updates device status information.
Left pane	The left side of the Home page displays a menu consisting of configuration and administration tasks.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 97 / 177

Home page section	Description
Configuration menu	The options under **Configuration** in the menu allow you to configure settings for various features. Some of the configuration settings are organized on sets of linked screens. The options in this menu may vary based on product and supported features.
Administration menu	The options under **Administration** in the menu allow you to complete common device administration tasks. See Administration and maintenance tasks for more information.
Apply button	The web interface runs locally on the device, which means that the interface always maintains and displays the latest settings in the Digi device. If you make changes, click **Apply** to apply the changes to the configuration settings to the Digi device.
Cancel changes to configuration settings	To cancel changes to configuration settings, click **Refresh** or **Reload** on the web browser. This causes the web browser to reload the page. Any changes made since the last time the you clicked **Apply** are reset to their original values.
Restore configuration to default	You can restore the device configuration on a Digi device to factory defaults. See Restore XBee Gateway factory defaults for more information. Note that you will have to reset the network configuration settings after the restore operation is complete.

Ethernet IP network settings

The **Ethernet Network** settings display the current IP address and DHCP settings for Ethernet network communications. You can change the IP address from the default either by obtaining a new one through DHCP or by entering a static IP address, subnet mask, and default gateway, and Domain Name System (DNS) servers.

Default Ethernet settings

For Ethernet networks, the default configuration for the Ethernet model of the XBee Gateway allows you to power up the XBee device and join an Ethernet network without any additional configuration. In this default configuration:

- XBee Gateway uses a DHCP server to obtain its IP address information. A DHCP server needs to provide an IP address, subnet mask, default gateway, and Domain Name System (DNS) server for the device. If you disable DHCP, you must set all of these IP address settings yourself. In the absence of a DHCP server, you need to assign a static IP address using the Digi Device Discovery Utility and changing the network settings through the web interface.
- The default behavior regarding NTP time server access, Configure Remote Manager connectivity settings, and DNS server all proceed as described.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 98 / 177

If your Ethernet network configuration does not match these default behaviors, you need to adjust the Ethernet network configuration settings. See Configure Ethernet Settings for more information.

Configure Ethernet Settings

To configure Ethernet settings, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Configure the Ethernet settings.

   For a Cellular module:

   a. Click the **Ethernet Network** properties. The **Ethernet Network** page appears.

   b. Complete the fields and click **Save** to save your changes.

   For a Wi-Fi module:

   a. Click the **Ethernet (eth)0** properties. The **Ethernet (etho)** page appears.

   b. Complete the fields and click **Save** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Select **Configuration** > **Ethernet Network** to access the Ethernet IP network settings.
3. Complete the fields and click **Apply** to save your changes.

Ethernet Network Configuration page

The following list describes the Ethernet network settings the **Ethernet Network** page by section.

Note The **Ethernet Network** page is only available for Wi-Fi models.

Current IP Parameters

This section displays the active Ethernet IP parameters for XBee Gateway.

- **IP Address**: The IP address assigned to network devices.
- **Subnet Mask**: The subnet mask assigned to the device. The subnet mask is combined with the IP address to determine which network this Digi device is part of.
- **Default Gateway**: The IP address of the computer that enables this Digi device to access other networks, such as the Internet.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 99 / 177

Interface Configuration

- **Enable this network interface**: Enables or disables the Ethernet network interface.
- **Speed**: The Ethernet speed that XBee Gateway uses on the Ethernet network.
  - **Automatic**: The device senses the Ethernet speed of the network and adjusts automatically. The default is **Automatic**. If one side of the Ethernet connection is using auto (negotiating), the other side can set the Ethernet speed to whatever value is desired. Or, if the other side is set for **100** Mbps, this side must use **100** Mbps.

    10: The device operates at 10 megabits per second (Mbps) only.
  - **100**: The device operates at 100 Mbps only.
- **Duplex Mode**: The mode that XBee Gateway uses to communicate on the Ethernet network. Specify one of the following options:
  - **Automatic**: The device senses the mode used on the network and adjusts automatically. The default is **auto**. If one side of the Ethernet connection is using **auto**, the other side can set the duplex value to whatever is desired. If one side uses a fixed value (for example, **half-duplex**), the other side has to use the same duplex mode.

    Full Duplex: The device communicates in full-duplex mode.

    Half Duplex: The device communicates in half-duplex mode.

Stored IP Configuration

You can set the IP address for XBee Gateway either automatically, using DHCP, or by assigning a static IP address. You must enable either the **DCHP** or the **Static IP** option.

- **DHCP**: Select **On** to enable DHCP to assign an IP address to the gateway. XBee Gateway uses a DHCP server to obtain its IP address information, by default. A DHCP server needs to provide an IP address, subnet mask, default gateway, and Domain Name System (DNS) server for the device. If you disable DHCP, you must enable the **Static IP** option and configure these settings manually.

  In the absence of a DHCP server, you must assign a static IP address by accessing the Digi Device Discovery tool and changing the network settings through that interface.
- **AutoIP**: Enables or disables use of AutoIP address assignment. When AutoIP is enabled, XBee Gateway automatically self-configures an IP address when an address is not available from other methods. For example, when the Digi device is configured for DHCP and a DHCP server is not currently available. For more information on AutoIP, see RFC 3927, Dynamic Configuration of IPv4 Link-Local Addresses.
- **Static IP**: Select **ON** to enable you to specify a static IP address for XBee Gateway. You must specify the following:
  - **IP Address**: The IP address assigned to network devices.
  - **Subnet Mask**: The subnet mask assigned to the device. The subnet mask is combined with the IP address to determine which network this Digi device is part of.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 100 / 177

- **Default Gateway**: The IP address of the computer that enables this Digi device to access other networks, such as the Internet.

Wireless (Wi-Fi) network settings

The **Wireless Network** settings display the current IP address and DHCP settings for Wi-Fi network communications. You can change the IP address, either by obtaining a new one through DHCP or by typing a static IP address.

Default wireless (Wi-Fi) settings

For Wi-Fi networks, the default behavior for XBee Gateway is as follows:

- The default behavior regarding NTP time server access, Configure Remote Manager connectivity settings, and DNS server all proceed as described.
- Use the configuration wizard configure the Wi-Fi interface. This wizard is launched from the XBee Gateway web interface. It “teaches” a Wi-Fi XBee Gateway device the wireless parameters needed to further configure wireless settings and operation. If you followed the steps Set up the XBee Gateway Wi-Fi hardware, you have already run this Wi-Fi wizard to connect to a Wi-Fi network.
- If you want to connect to another Wi-Fi network than the one to which XBee Gateway is currently connected, you must run the Wi-Fi Wizard again.

If your Wi-Fi network configuration does not match these default behaviors, you need to adjust the Wi-Fi network configuration settings. See Wireless (Wi-Fi) network settings for more information.

Configure wireless settings

To configure wireless settings:

From Remote Manager

1. Click the **Device Management** tab.
2. From the Device Management device list, double-click the device to display the device properties menu.
3. Click the **WiFi** properties.
4. Complete the fields and click **Apply** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Click **Configuration** > **Wireless Network**.
3. Complete the fields.
4. Click **Apply** to save your changes.

Wi-Fi network settings

The following list describes the Wi-Fi network settings by section:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 101 / 177

- Current IP Parameters
- Interface Configuration
- Stored IP Configuration
- Host Name Configuration
- Domain name (web interface only)

Current IP Parameters

This section displays the active Wi-Fi IP parameters for XBee Gateway.

- **IP Address**: The IP address assigned to network devices.
- **Subnet Mask**: The subnet mask assigned to the device. The subnet mask is combined with the IP address to determine which network this Digi device is part of.
- **Default Gateway**: The IP address of the computer that enables this Digi device to access other networks, such as the Internet.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Interface Configuration

- **Enable this network interface**: Enables or disables the wireless network interface.
- **Wireless Wizard**: The **Wireless Wizard** link launches a wizard that provides a Wi-Fi XBee Gateway device the wireless parameters needed to configure wireless settings and operation. The wizard provides a place to copy in the information required for to the connect to your local Wi-Fi network. In this instance, XBee Gateway is a Wi-Fi "client" connecting to an existing access point. Obtain the wireless network information that XBee Gateway will use from the network administrator and enter this information in the wizard.

  You need to rerun the Wireless Wizard each time you want to connect to a new wireless network.

  To complete the wizard:

  1. Check with your network administrator on the Wi-Fi security mode and associated parameters for your network, including any passphrase or key used to connect to your Wi-Fi access point.
  2. On the page **Step 1/Network SSID**, select or type the name (case-sensitive) of the Wi-Fi network access point XBee Gateway will use to connect to the internet.
  3. On the page **Step 2/Select Security Mode and associated parameters**: Select the security mode used for the Wi-Fi network connection, for example, **Open** (no user name / password / shared key) or **WPA/WPA2 Personal** (a shared key required).
  4. Depending on the network security mode, you will be prompted to type additional parameters, such as the passphrase or key (case-sensitive) used to connect to your access point.

     Messages appear while processing the parameters and when the wizard completes.

  For security reasons, the wireless configuration resulting from running this wizard cannot be viewed, only modified by re-running the wizard.

Stored IP Configuration

- **DHCP (Remote Manager)**: Enables or disables obtaining an IP address automatically using DHCP. When the Digi device is rebooted, it will obtain new network settings. Use Digi Device Discovery to find the Digi device, because it will likely have a new address.
- **AutoIP (Remote Manager)**: Enables or disables use of AutoIP address assignment. When AutoIP is enabled, XBee Gateway automatically self-configures an IP address when an address is not available from other methods, for example, when the Digi device is configured for DHCP and a DHCP server is not currently available.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- **Static IP**: The static IP address to be assigned to XBee Gateway.
  - **IP Address**: The IP address assigned to network devices.
  - **Subnet Mask**: The subnet mask assigned to the device. The subnet mask is combined with the IP address to determine which network this Digi device is part of.
  - **Default Gateway**: The IP address of the computer that enables this Digi device to access other networks, such as the Internet.

Host Name Configuration

Host Name: An optional identifier.

Domain name (web interface only)

A DNS (Domain Name System) server is an Internet service that resolves domain names into IP addresses. Name resolution is important when connecting to Remote Manager, as the Digi servers are provided as fully-qualified domain names.

XBee Gateway is capable of using up to three DNS servers. Up to two of these slots may be filled with DNS servers from dynamic IP assignment sources, leaving at least one slot always available for static DNS server configuration. A reasonable default is supplied for one static DNS server, but this default may not be appropriate for all customer networks.

Mobile connectivity settings

The mobile settings allow you to configure how to connect to mobile (cellular) networks using the mobile connection, including the service provider, service plan, and settings used in connecting to the mobile network. Additional settings configure the Digi SureLink™ feature and the use of Short Message Service (SMS).

The process for configuring your device and the settings displayed on the **Mobile Configuration** page vary according to whether the mobile service provider network used with your Digi Cellular Family product is based on GSM (Global System for Mobile communication) or CDMA (Code-Division Multiple Access).

To configure the cellular interface for XBee Gateway, select the link below that best matches the cellular interface of your device and follow the steps listed to configure your device.

- Set up and configure GSM-based devices
- Provision a CDMA-based device

There are several other related settings for cellular devices, including:

- Mobile Connectivity Configuration page
- Digi Mobile SureLink™ settings
- Mobile firewall settings

Once the mobile settings have been configured, you can monitor the status of mobile connections by going to **Administration** > **Mobile Status**. See Mobile device status for more information.

Default behavior with the cellular network

For cellular networks, the default behavior for XBee Gateway is as follows:

- The default behavior regarding NTP time server access, Configure Remote Manager connectivity settings, and DNS server all proceed as described.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
㈜테솔 · www.tessol.com TS-TL-DGI-049 104 / 177
KOLAS 국제공인교정기관 · ISO/IEC 17025

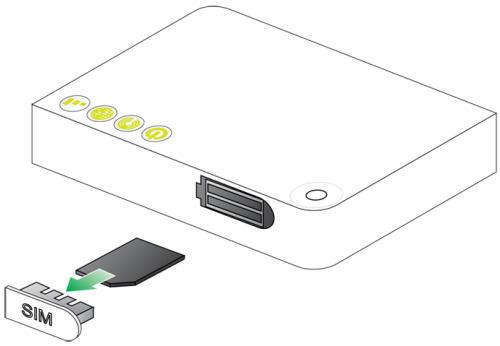
- You must connect XBee Gateway to the cellular network. How you connect XBee Gateway to the cellular network depends on the type of cellular modem in the device.
- First-time activation of an XBee Gateway in a cellular network could take up to five minutes or longer.
- For Verizon service, generally, if a mobile connection bring-up fails within 30 seconds, the device will wait before trying again.
- If only a 3G signal is available, but no 1xRTT signal, the device will not provision. If only an 1xRTT signal is available but no 3G signal, the device will provision, but it will operate at a slower speed.
- Signal strength, account registration, and other issues can impact activation. For common issues and resolutions, see Cellular connection issues.
- The XBee Gateway cellular module sends a single SMS message, containing the device's phone number, to register the device with Remote Manager Technical Support, as described in Remote Manager SMS opt-in. Your cellular account must be set up to send and receive SMS messages.

Set up and configure GSM-based devices

This task requires a small screwdriver and a SIM card for your GSM-based device.

To set up and configure mobile connectivity for a GSM-based device:

1. Obtain an account with your carrier of choice. The carrier will provide a SIM card and account information, such as the APN and possibly a user name and password for the account.
2. Install the SIM card in the device.
    a. Using a small screwdriver, remove the SIM card cage labeled **SIM**.
    b. Insert the SIM card in the card cage, with the card oriented as shown in the drawing. Make sure card is firmly inserted into the card cage.
    c. Replace the cage in the slot until it clicks.



3. Power on the device.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

4. Go to the **Mobile Connectivity** page.
   - For Remote Manager, access Remote Manager and log in. Click the **Mobile Connectivity** link.

     See Configure settings from Remote Manager for information about adding a device to Remote Manager.
   - For the web interface, open a browser and access and log in to the XBee Gateway web interface. Click **Configuration** > **Mobile Connectivity**.

     See Configure settings from the XBee Gateway web interface for information about accessing the web interface.
5. Under the **Current Settings**, enter the connection settings for the cellular modem in the device. You can get this information from your service provider and the information varies by service provider. In some cases, a user name, password, or PIN are not necessary. See Mobile Connectivity Configuration page for more information about the fields in this screen.
   a. In the **Mobile APN** field, enter the Access Point Name (APN).
   b. In the **Username** and **Password** fields, enter the user name and the password, if provided.
   c. In the **SIM PIN** filed, enter the SIM PIN, if provided.
   d. Click **Save** in Remote Manager or **Apply** in the web interface to save the mobile connectivity information to XBee Gateway.

   Note SMS settings are enabled by default. For information about these settings, see the Short Message Service (SMS).
6. **For the web interface only**: Go to the **Administration** > **Mobile Status** page and complete the fields. The device should now be able to connect to the mobile network. The status fields on the **Administration** > **Mobile Status** fields will change to reflect the connectivity status.

   If the device successfully connects to the networks, two key connectivity status fields appear as follows: **SIM Pin State: READY** and **Connection state: Connected**.

   If the device does not connect to the network, you do not see **SIM Pin State** on the Mobile Status page, and/or the **Connection state** field has a value other than Connected, additional setup and troubleshooting is necessary. See Troubleshooting XBee Gateway GSM devices.

Provision a CDMA-based device

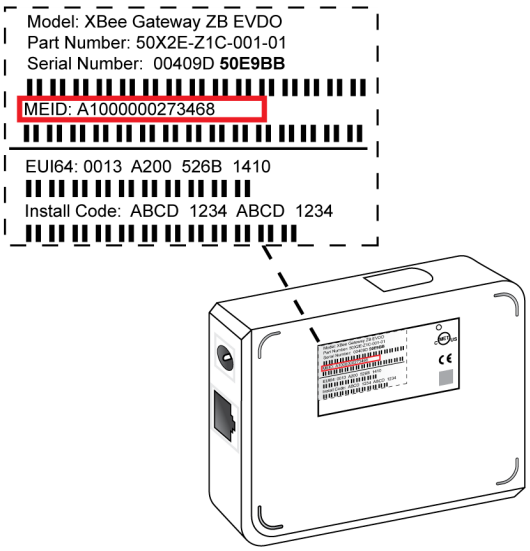
Provision your XBee Gateway cellular device with the required information used to access the cellular network. Typically, an automatic provisioning process is used to provision the device. For Verizon, that process is OTASP (Over the Air Service Programming). For Sprint, the process is OMA DM (Open Mobile Alliance Device Management. This automatic provisioning requires the cellular modem in the XBee Gateway cellular device to communicate over the cellular network, and requires a good cellular signal.

To provision a CDMA-based device:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

1. Locate and write down the unique ID, called an **MEID**, on the product label on the bottom on of your XBee Gateway cellular device.



2. Obtain an account with your cellular carrier and provide the carrier account representative the MEID of the device. The representative will create an account for the XBee Gateway cellular device based on the MEID.
3. Power on the device.
4. Open a browser and access and log in to the XBee Gateway web interface.
5. Under **Administration**, click **Mobile Status**. The Mobile Status page appears.
6. Check the status in the **Provisioning status** and **Connection state** fields. The possible statuses are as follows:
   - **Provisioning status: Provisioned** and **Connection state: Connected** indicates XBee Gateway device was successfully provisioned and is connected to the cellular network.
   - **Provisioning status: Provisioning operation failed** indicates provisioning failed on the XBee Gateway device. Additional information on this provisioning failure may appear on the Mobile Status page. See Troubleshooting XBee Gateway CDMA devices for more information.

Configure mobile settings

To configure mobile settings, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

3. Click **Mobile Connectivity**. The mobile connectivity settings identify the service provider to use when connecting to the mobile network. Some values may be hidden, depending on your model.
4. Complete the fields and click **Save** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Click **Configuration** > **Mobile Connectivity**. The **Mobile Connectivity** settings identify the service provider to use when connecting to the mobile network. The displayed information is currently the same for GSM- or CDMA-based products. Some values may be hidden, depending on your model.
3. To configure SMS settings, click **Cellular SMS** and Remote Manager SMS under **Advanced Configuration**.
4. Complete the fields and click **Apply** to save your changes.

Mobile Connectivity Configuration page

The Mobile Connectivity settings identify the service provider to use when connecting to the mobile network. The information that appears varies by product and whether the device is GSM- or CDMA-based. In addition, you can enable and configure the Short Message Service (SMS) from this page. For GSM-based devices, enter the information for your account after you receive it from the mobile service provider.

The fields on the **Mobile Connectivity Configuration** page are described as follows:

Current Status

This field displays the current status of the cellular modem and mobile connection, including serial number information, signal strength and quality, and connection state.

Current Settings

For CDMA-based devices, no settings appear.

For GSM-based devices, the following settings appear:

- **Mobile APN**: The service plan or access point name (APN).
- **Username**: The user name of the mobile connection needed to access the mobile network. Depending on mobile service provider, this value may not be necessary.
- **Password**: The password of the mobile connection needed to access the mobile network. Depending on mobile service provider, this value may not be necessary.
- **SIM PIN**: A password that allows an administrator of the device to access information on the SIM card. The password is usually between four and eight digits. SIM PINs act like ATM PINs in that they require users to authenticate themselves as the true owner of the card before information is released. Depending on mobile service provider, this value may not be necessary.

Short Message Service (SMS) settings

The SMS settings options configure the cellular Short Message Service (SMS) capabilities of the cellular modem.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- **Enable cellular Short Message Service (SMS) services**: Enables or disables SMS features on this Digi device. When this option is enabled, the you can configure the remaining SMS options. This option is enabled (on) by default. When you disable SMS services, all SMS-related menu items in the web interface and Remote Manager are disabled.

Device Cloud SMS settings

These settings configure the Remote Manager-registered device to be managed by Remote Manager via Short Message Service (SMS) messages.

- **Enable Device Cloud SMS**: Enables or disables Remote Manager SMS support.
- **Phone Number**: The phone number or short code of the Remote Manager server. This is a setting in the device that allows the device to send to Remote Manager, and possibly restrict messages to those coming from Remote Manager. The default value phone number is **32075**.
- **Service Identifier**: The Service Identifier (prefix) of Remote Manager. This field is an optional setting. You can use it when there is a shared short code in use, and an identifier (prefix) is required to redirect a message to a specific service under that short code. The default value is **idgp**. Use of the **Service Identifier idgp** is mandatory when the Phone Number is **32075**.
- **Opt-in:** : Enables or disables the Device Cloud SMS opt-in feature. By default, XBee Gateway cellular models are configured to automatically register with the Remote Manager Technical Support when you first power up your device. Activation with Remote Manager Technical Support is free. The Remote Manager Technical Support team will only access your device upon your approval. With your consent, the Remote Manager Technical Support team can view and access your device to diagnose and resolve issues if you require assistance. In the automatic registration process, XBee Gateway cellular models attempt to send a single SMS message containing the device's mobile phone number. Your cellular account must be set up to send and receive SMS messages. Network costs associated with this single SMS transmission are the customer's responsibility. Any device information stored in the Remote Manager Technical Account is secured with adherence to Remote Manager's security and privacy procedures, and will not be disclosed to, or accessible by third parties.
- **Restrict Sender**: Only process inbound messages for Remote Manager from the number specified in the Phone Number setting. Messages from other phone numbers will be passed on to other SMS Services on the device.
- **Reply to Sender Phone Number**: This is an advanced option that rarely needs to be changed. This option directs Remote Manager command replies to be sent to the phone number of the sender of the request. Clear this check box to force replies to be sent to the configured phone number.

Short Message Service (SMS)

You can configure Short Message Service (SMS) communications are used to communicate with XBee Gateway with the SMS settings. The SMS settings allow you to send SMS messages and commands to and from XBee Gateway. There are two types of SMS interactions supported:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 109 / 177

- Remote Manager SMS
- Remote Manager Raw SMS messaging

SMS is a feature that may be available as part of your mobile service agreement. However, sending and receiving short messages (or “text messages”) may have additional costs. Before using the SMS capabilities of your Digi device, verify with your mobile service provider that your agreement includes SMS as part of your service plan. Understand the costs of SMS before you enable the SMS features on this Digi device.

Remote Manager SMS opt-in

XBee Gateway cellular models are configured to automatically register an account with Remote Manager Technical Support when you first power up your device. Activation with Remote Manager Technical Support is free. The Remote Manager Technical Support team will only access your device upon your approval. With your consent, Remote Manager Technical Support team can see and access to your device to diagnose and resolve issues if you require assistance.

In the automatic registration process, XBee Gateway cellular models sends a single SMS message containing the device’s mobile phone number. Your cellular account must be set up to send and receive SMS messages. Network costs associated with this single SMS transmission are the customer’s responsibility. Any device information stored in the Remote Manager Technical Account is secured with adherence to Remote Manager’s security and privacy procedures, and will not be disclosed to, or accessible by third parties.

Remote Manager SMS

The Remote Manager SMS feature supports sending and receiving SMS messages between Remote Manager and a Remote Manager-registered device. You can use the Remote Manager SMS to:

- Send an SMS message to the Remote Manager-registered device in order to have the device dynamically establish its EDP connection with Remote Manager.
- Send user-defined data to and from Remote Manager and Remote Manager-registered devices.
- Perform limited device management such as pinging the Remote Manager-registered device, as well as provisioning it properly for SMS functionality with Remote Manager.

With Remote Manager-registered devices that support the Remote Manager SMS feature, Remote Manager can send an SMS message to the Remote Manager-registered device, instructing the device to establish its EDP connection to Remote Manager. Once the device uploads its data to Remote Manager, Remote Manager can then disconnect the EDP connection resulting in lower cellular data usage because the EDP connection no longer needs to be maintained around the clock.

Remote Manager SMS support makes sending data between Remote Manager-registered devices and Remote Manager easy and reliable. This Remote Manager feature augments and overcomes the limitations of using basic SMS messages in several ways:

- Send request/response pairs allowing confirmation of messages, as well as allowing Remote Manager-registered devices to respond to user commands sent though Remote Manager.
- Send messages larger than a single SMS message. Remote Manager automatically splits up and re-assembles large messages into a multi-part message without requiring any user intervention.
- Send binary messages (basic SMS messages are limited to text only).
- Guarantee data integrity (basic SMS messages do not guarantee integrity).

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 110 / 177

Complete details on configuring and using Remote Manager SMS are in the *Digi Remote Manager User Guide*.

Remote Manager Raw SMS messaging

In addition to Remote Manager-formatted messages, you can send an SMS message without Remote Manager modifying it. This method is referred to as “raw SMS messaging”. This type of messaging is useful when you want to use every byte of the SMS message (the Remote Manager protocol takes approximately 5 bytes per message of overhead), or when you use a device that doesn't have Remote Manager protocol support but does have SMS support.

Raw messages are not modified by Remote Manager and are subject to the restrictions of the SMS messaging interface. SMS raw messages are subject to the limitations of standard SMS messages:

- They are a maximum of 160 characters.
- The supported characters are dependent on your carrier, but are characters only (not binary).
- Delivery of these characters is not guaranteed and the characters could be delivered more than once.
- The delivered characters are not guaranteed to be correct (they are subject to corruption).

To learn more about this feature, see the *Digi Remote Manager Programmer Guide*.

SMS settings

The Remote Manager provides the following SMS settings when you right-click the menu for XBee Gateway cellular models:

- **Properties** > **Advanced Configuration** > **Cellular SMS**
- **Properties** > **Advanced Configuration** > **Device Cloud SMS**
- **SMS** > SMS **commands** | **Configure**

Properties > Advanced Configuration > Cellular SMS

Enabled: This setting enables or disables all SMS features on this Digi device. When you enable this option, the remaining SMS options may be configured. This option is disabled (off) by default.

Properties > Advanced Configuration > Device Cloud SMS

These settings configure the Remote Manager-registered device to be managed by Remote Manager via Short Message Service (SMS) messages.

- **State**: Enables or disables Remote Manager SMS support.
- **Restrict Sender to only Server Phone Number**: Only process inbound messages for Remote Manager from the number specified in the Phone Number setting. Messages from other phone numbers will be passed on to other SMS Services on the device.
- **Server Phone Number**: The phone number or short code of the Remote Manager platform. For more information on the Remote Manager SMS Phone Number and Service ID fields, contact your Digi sales Representative, or use the Remote Manager Provision command. The default value for the phone number is **32075**.
- **Server Service Identifier**: The Service Identifier (prefix) of Remote Manager. This field is an optional setting. Use the Service Identifier when there is a shared short code in use, and an identifier (prefix) is required to redirect a message to a specific service under that short code. The default value is **idgp**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

SMS > SMS commands | Configure

When you right-click the device and selecting SMS from the menu, a set of SMS commands and an option to configure settings appears. Of the commands displayed in the list, the only ones currently supported are:

- ***Request Connect***

  SMS > **Request Connect** sends an SMS message from Remote Manager to the Remote Manager-registered device, telling the device to establish an EDP connection with the Remote Manager server.

- ***Reboot***

  SMS > **Reboot** sends a Remote Manager SMS message to the device to reboot itself.

- ***Configure***

  SMS > **Configure** registers the phone number of your cellular device, allowing Remote Manager to send messages to it. For details on these settings, see Configure device phone number in the *Digi Remote Manager User Guide*.

Digi Mobile SureLink™ settings

SureLink is an optional feature that monitors the integrity of an established network connection.

Currently only cellular communications support SureLink.

You can configure the **Link Integrity Monitoring** settings to run a test that examines the functional integrity of the network connection, and take action to recover the connection in the event that the connection is lost.

Configure Mobile SureLink settings

To configure SureLink settings, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Click **SureLink**.
4. Complete the fields and then click **Save** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Click **Configuration** > **SureLink**.
3. Click on the **Mobile Link Integrity Monitoring** section.
4. Complete the fields and then click **Apply** to save your changes.

Mobile SureLink integrity monitoring settings

Enable Link Integrity Monitoring using the test method selected below

Enables or disables the link integrity monitoring tests. If this setting is enabled, you can configure the other Link Integrity Monitoring settings and use these settings to verify the functional integrity of the mobile connection. The default is **off** (disabled).

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 112 / 177

Link Integrity Monitoring Method

Several tests are available. For details about each type, see Link integrity test options.

- Ping Test
- TCP Connection Test
- DNS Lookup Test
- Device Cloud Connection Test

Host Address

These settings apply to **Ping**, **TCP Connection**, and **DNS Lookup** tests only. Two hostnames may be configured for the link integrity monitoring test. You can specify hostnames in the form of domain names or IP addresses. If the first hostname fails to reply, the same test is sent to the second hostname. The test fails if no reply is received for either hostname. The primary and secondary DNS names must be fully qualified domain names. Note that the reverse lookup of an IP address is possible, but that is usually unlikely to succeed in returning a name. You can still use a reverse lookup to demonstrate the integrity of the mobile connection.

TCP Port

The TCP port number to connect to on the remote host. The default is 80.

Repeat the selected link integrity test every N seconds

Specifies the interval, in seconds, at which the selected test is initiated (repeated). A new test will be started every N seconds while the mobile connection is established. This value must be between 10 and 65535. The default is 240. Only the **Ping**, **TCP Connection Test**, and **DNS Lookup Test** options use this setting. The **Device Cloud Connection Test** option does not use this setting.

If the configured interval is less time than it takes a test to complete, the next test will not be initiated until the previous (current) test has completed.

Test only when idle if no data is received for the above period of time

Repeats the test using the test repeat interval (above) after an idle period interval. That is, initiate the selected link integrity test only after no data has been received for the specified interval of time. This changes the behavior of the test in that the test interval varies according to the presence of other data received from the mobile connection. Only the **Ping**, **TCP Connection Test**, and **DNS Lookup Test** options use this setting. The **Device Cloud Connection Test** option does not use this setting.

Although using this idle option may result in less data being exchanged over the mobile connection, it also prevents the link integrity tests from running as often to verify the true bi-directional state of that connection.

Reset the link after this many link integrity test failures

The mobile connection resets or reconnects after the specified number of consecutive line integrity test failures. The mobile connection (reset or reconnect) is determined by the Link failure action setting.

This value must be between 1 and 255. The default is 3. When the mobile connection is reestablished, the “consecutive failures” counter is reset to zero.

If the mobile connection is disconnected for any reason (including not as a result of a link integrity test failure), the consecutive failures count is reset to zero when the mobile connection is reestablished.

Link Failure Action

The action to be performed when a link failure is detected:

- **No action**: No action is performed.
- **Reset device**: Reset the cellular modem in the XBee Gateway device.
- **Reconnect interface**: Reconnect the cellular interface.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
㈜테솔 · www.tessol.com TS-TL-DGI-049 113 / 177
KOLAS 국제공인교정기관 · ISO/IEC 17025

TESSOL Technical Library
TS-TL-DGI-049

Link integrity test options

There are several link integrity tests available:

- **Ping Test**
- **TCP Connection Test**
- **DNS Lookup Test**
- **Device Cloud Connection Test**

You can use these tests to demonstrate that two-way communication is working over the mobile connection. Several tests are provided because different mobile networks or firewalls may allow or block Internet packets for various services. Select the appropriate test according to the mobile network constraints and your preferences.

The link integrity tests are only performed while the mobile connection is established. If the mobile connection is disconnected, the link integrity tests are suspended until the connection is established again.

For the link integrity tests to provide meaningful results, the remote or target hosts must be accessible over the mobile connection and not through the LAN interface of the device (if it has one). That is, you should configure the settings to guarantee that the mobile connection is actually being tested.

You can modify the link integrity test settings at any time. These changes go into effect at the start of the next test interval.

Ping Test

Enables or disables the use of “ping” (ICMP) as a test to verify the integrity of the mobile connection. The test is successful if a valid ping reply is received in response to the ping request sent. The ping test sends 1 ping request and waits up to 30 pings for a reply. When a valid reply is received, the test completes successfully and immediately.

You can configure destination hosts for this test. If the first host fails to reply to the ping request, the same test is attempted to the second host. If neither host replies to any of the ping requests sent, the test fails. The primary and secondary addresses may be either IP addresses or fully qualified domain names.

- **Primary Address**: First host to test.
- **Secondary Address**: Second host to test if the first host fails.

TCP Connection Test

Enables or disables the creation of a new TCP connection as a test to verify the integrity of the mobile connection. A successful test establishes a TCP connection to a specified remote host and port number. If the remote host actively refuses the connection request, the test fails. The TCP connection test waits up to 30 seconds for the connection to be established or refused. When the TCP connection is established, the test completes successfully, and the TCP connection is closed immediately.

You can configure two destination hosts for this test. If the first host fails to establish (or refuse) the TCP connection, the same test is attempted to the second host. If neither host successfully establishes (or refuses) the TCP connection, the test fails. The primary and secondary addresses may be either IP addresses or fully qualified domain names.

- **TCP Port**: The TCP port number to connect to on the remote host. The default is 80.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
㈜테솔 · www.tessol.com TS-TL-DGI-049 114 / 177
KOLAS 국제공인교정기관 · ISO/IEC 17025

DNS Lookup Test

nables or disables the use of a Domain Name Server (DNS) lookup as a test to verify the integrity of the mobile connection. The test is successful if the DNS server sends valid reply. Typically, this means the hostname is successfully “resolved” to an IP address by a DNS server. But even a reply such as “not found” or “name does not exist” is acceptable as a successful test result, because that demonstrates successful two-way communication over the mobile connection. When a valid reply is received, the test completes successfully and immediately.

This test uses the primary and secondary DNS server obtained from the mobile network when the PPP connection is first established. You can view these addresses on the **Administration** > **Mobile Status** page.

Note The LTE modem does not use a PPP connection.

Device Cloud Connection Test

Enables or disables verification of the Remote Manager connection. The test is successful if you can establish a connection to the configured Remote Manager server, and if you can exchange keep-alive messages with the server. The test fails if you cannot establish a connection or if keep-alive messages stop. You can configure the Remote Manager server on the **Advanced Configuration** > **Device Cloud Connectivity** page.

DNS settings

These settings are the two Domain Name System servers to be used as static servers when dynamic mechanisms do not supply enough DNS servers.

See Default behavior regarding DNS for more information about default behavior.

Configure Domain Name Server (DNS)

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Click **Domain Name Server (DNS)**.
4. Complete the fields and click **Save** to save your changes.

Domain Name Server (DNS) Configuration page

In this page you can configure the Domain Name System servers to be used as static servers when dynamic mechanisms do not supply enough DNS servers. The IP addresses of Domain Name Servers (DNS) used to resolve computer host names to IP addresses. Static DNS servers are specified independently of any network interface and its connection state. An IP address of 0.0.0.0 indicates no server is specified.

- **Primary DNS**: The name of the primary DNS server.
- **Secondary DNS**: The second DNS server that is used if the primary DNS server fails to respond.
- **Alternate DNS**: A DNS server that is used if the primary or secondary DNS servers fail to respond.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 115 / 177

Mobile firewall settings

You can configure a network firewall for the XBee Gateway mobile network interface in the firewall configuration page. This firewall reduces cellular traffic and cloaks the device, making it harder to find and reduces the risk of unauthorized access and attacks. While this firewall does not reduce the traffic sent to the device, it prevents the device from replying to it, because the firewall discards the packets sent to it, unless the packets are associated with an established communication (connection).

Note This is available for cellular models only.

See Firewalls and required open ports for more information.

Configure mobile firewall settings

To configure mobile firewall settings, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Select **Mobile Firewall**.
4. Complete the fields and click **Save** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Select **Configuration** > **Mobile Firewall** to access the mobile firewall settings.
3. Complete the fields and click **Apply** to save your changes.

Enable or Disable Mobile firewall settings

Enable the firewall for the mobile network interface

- **On**: Enable the firewall for the mobile network interface. By default the firewall is **on** (enabled).
- **Off**: Disable the firewall for the mobile network interface.

CAUTION! Disabling the mobile firewall may expose the device to attacks through the mobile network.

Autostart settings for the Python Program

You can use the Python autostart settings to configure Python programs that are loaded on XBee Gateway to automatically start when the device starts. These programs are executed through the specified python commands.

See File management for details on loading files.

See Configure a Python application in the web interface for more information on managing application files and their associated Python processes.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Configure Python settings

To configure Python settings, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Click **Python**.
4. Complete the fields and click **Save** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Click **Configuration** > **Python** to access the Python network settings.
3. Complete the fields and click **Apply** to save your changes.

Python settings

The **Python Configuration** page displays the following Python settings:

- **Enable**: Enables or disables the associated Python command for this Digi device. When you select this check box, the associated Python program automatically starts on system startup.
- **Command Line (with optional arguments)**: Type the name of the Python file, and any program arguments, required to start on system startup.
- **Active**: When the icon is green, the Python program is running.
- **On Program Exit**: Select the action to be performed when the program exits. Your options are as follows:
  - **No action taken**: Continue device operation without doing anything about the program.
  - **Restart python program**: Restart the Python program.
  - **Reboot the device**: Reboot the device.

Button service assignments settings

The button on the XBee Gateway can be configured to perform certain actions.

Configure button service assignments

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Click **Advanced Configuration** > **Button service assignments**. The **Button service assignments** page appears.
4. Complete the fields and click **Save** to save your changes.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 117 / 177

Button service assignments page

In this page you can configure the action of the button on the XBee Gateway device.

- **Reset to factory defaults**: When this feature is enabled, you can press and hold the button for 10 seconds to restore the device to its factory default configuration. This action clears any configuration settings you may have entered through the supported device interfaces. This feature is enabled by default. See Restore XBee Gateway factory defaults for more information.
- **Launch web server only after the button press**: When this feature is enabled, you can use the button to allow access to the web interface only when the button is pressed. When you press the button, the web interface remains open for a five minute window. This feature is disabled by default. See Use the button to enable the web interface for more information.
- **Allow changes with ADDP only after the button press**: You can configure the button on the XBee Gateway device to control the length of time during which the Digi Device Discovery tool is available to display and change configuration settings. You can choose between a no-time limit window and a five-minute time window. This feature is disabled by default. See Use discovery tools to enable configuration changes for more information.
- **Enter Wi-Fi config mode if Wi-Fi is unconfigured**: When the special-purpose Wi-Fi configuration mode is enabled, you can press the button on the XBee Gateway device to enable the Access Point mode on your XBee Gateway device and create a temporary access point. You can use this temporary access point to configure the XBee Gateway device. This feature is assigned to a the button on the XBee Gateway device by default. See Use the button to enable special-purpose Wi-Fi configuration mode for more information.

Note This option is available only for Wi-Fi models.

Restore XBee Gateway factory defaults

You can restore the device to its factory default configuration. This action clears any configuration settings you may have entered through the supported device interfaces. This feature is assigned to the button by default.

On the XBee Gateway device, press and hold the button for ten seconds to return the device settings to factory defaults.

Use discovery tools to enable configuration changes

You can configure the button on the XBee Gateway device to control the length of time during which the Digi Device Discovery tool is available to display and change configuration settings.

Note If your firmware version is 3.2.30.x or later, the Digi Device Discovery tool is by default not allowed to change configuration of the XBee Gateway device. ADDP must have the **Read-Write** mode enabled in order for the button on the XBee Gateway device to control this feature.

To configure the button:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

1. Log into your Remote Manager account.
2. Click the **Device Management** tab.
3. From the device list, double-click the device to display the device properties menu.
4. Verify that the **Read-Write** mode for ADDP is enabled.
   a. Click **Network Services**.
   b. From the **Device Discovery Service (ADDP) Mode** list box, select **Read-Write**.
   c. Click **Save**.
5. Configure the button.
   a. Click **Advanced Configuration** > **Button service assignments**. The **Button service assignments** page appears.
   b. Choose between a no-time limit window and a five-minute time window:
      - **Enable**: When this feature is enabled and you press the button on the device, changes made using the Digi Device Discovery tool are restricted to a five-minute window.
      - **Disable**: When this feature is disabled and you press the button on the device, you can display configuration information and make changes using the Digi Device Discovery tool with a no-time limit window. This feature is disabled by default.
   c. Click **Save**.

Note You will be prompted for a password when you change configuration settings using the Digi Device Discovery tool. Leave the field in the prompt blank and click **OK**.

See Button service assignments settings for information on how to configure the button.

Use the button to enable special-purpose Wi-Fi configuration mode

Enabling the special-purpose Wi-Fi configuration mode allows you to press the button on the XBee Gateway device to enable the Access Point mode on your XBee Gateway device and create a temporary access point.

Once the XBee Gateway gateway's access point is available, you can use the Wireless Network Connection feature on your laptop to connect to the access point and configure your device. The name (SSID) of the access point will be **xbgw-xx:xx:xx:xx:xx:xx**, where **xx:xx:xx:xx:xx:xx** is the serial number of the gateway.

Each time you press the button, the time-limit window of access point mode operation is extended.

If you do not assign this feature to the button on the XBee Gateway device, a Wi-Fi configuration access point mode will not be available.

This feature is assigned to a the button on the XBee Gateway device by default.

Note You can only do this on an XBee Gateway device that has not been configured for Wi-Fi.

See Button service assignments settings for information on how to configure the button.

To configure the button:

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

1. Log into your Remote Manager account.
2. Click the **Device Management** tab.
3. From the device list, double-click the device to display the device properties menu.
4. Click **Advanced Configuration** > **Button service assignments**. The **Button service assignments** page appears.
5. Enable the **Enter Wi-Fi config mode if Wi-Fi is unconfigured** option.
6. Click **Save**.

Use the button to enable the web interface

By default, you can access the XBee Gateway web interface without pressing a button.

You can configure the button to allow access to the web interface only when the button is pressed. When you press the button, the web interface remains open for a five minute window.

See Button service assignments settings for information on how to configure the button.

To configure the button:

1. Log into your Remote Manager account.
2. Click the **Device Management** tab.
3. From the device list, double-click the device to display the device properties menu.
4. Click **Advanced Configuration** > **Button service assignments**. The **Button service assignments** page appears.
5. Enable the **Launch web server only after the button press** option.
6. Click **Save**.

Configure Remote Manager connectivity settings

XBee Gateway is compatible with the Remote Manager device and data management platform. Remote Manager provides a mechanism to do more advanced device configuration than is generally possible from the XBee Gateway web interface. Once the device has established network connectivity to Remote Manager, you can manage the device remotely using the Remote Manager interface.

Remote Manager connectivity is enabled by default. When you power on XBee Gateway in any network, it attempts to connect to a Remote Manager server.

The only time you need to change any Remote Manager configuration settings are under the following circumstances:

- You want to change the instance of Remote Manager to which XBee Gateway is connected. See Connect to a different instance of Remote Manager.
- XBee Gateway operates in a network with firewalls. In this case, you will need to configure a proxy server. See Configure a proxy server.

The basic **Device Cloud Configuration** settings allow you to enable or disable the connection to the Remote Manager server used for managing the XBee Gateway device, configure the Remote Manager server, and configures the proxy server, if used. The Advanced Settings configure additional behaviors for the Remote Manager connection, including connect and disconnect behaviors, protocol details, and use of keepalives for the connection. The default settings for Remote Manager remote management usually work for most situations.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 120 / 177

Configure connectivity settings

To configure connectivity settings, choose one of the following options:

From Remote Manager

1. Access and log in to Remote Manager.
2. Click the **Device Management** tab.
3. From the device list, double-click the device to display the device properties menu.
4. Click **Device Cloud Configuration** to display the basic settings. The **Device Cloud Configuration** page appears.
5. Complete the fields under **Basic settings**. See Basic connectivity settings.
6. Click **Advanced Settings** to display the advanced settings.
7. Complete the fields under **Advanced settings**. See Advanced connectivity settings.
8. Complete the fields and click **Save** to save your changes.

From the XBee Gateway web interface

1. Access the XBee Gateway web interface.
2. Select **Configuration** > **Device Cloud Connectivity** to access the connectivity settings. The **Device Cloud Configuration** page displays the basic settings.
3. Complete the fields under basic settings. See Basic connectivity settings.
4. Click **Advanced Settings**. The Advanced Settings section on the **Device Cloud Configuration** page appears.
5. Complete the fields under **Advanced Settings**. See Advanced connectivity settings for the web interface.
6. Click **Apply** to save your changes.

Basic connectivity settings

- **Enable Device Cloud Connectivity** (Device Cloud)
  Let my XBee Gateway connect to Device Cloud (web interface):

  Enables or disables the connection from XBee Gateway to the Remote Manager server. Disable this feature if you have no use for Remote Manager, and want to eliminate any Remote Manager-related network traffic.

- **Device Cloud Server** (Remote Manager)
  Server URL (web interface):

  The value for this setting is generally a Fully Qualified Domain Name (FQDN) pointing to one of the Remote Manager servers. Obtain this value from your Remote Manager server administrator. Typically this administrator is Digi. The default value is my.devicecloud.com.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- **Device Cloud Server Port** (Remote Manager)
  Server Port (web interface):
  The network port number for the Remote Manager server. The default value is 3199.
- **Proxy Server**: The Proxy Server settings configure XBee Gateway to connect to Remote Manager using HTTP over proxy. You can create a path to a Remote Manager server through a local HTTP proxy, such as squid, provided that you use the server to simply remap the target IP address and port number, without extra authentication or other security measures. This setting specifies the URL of the system that provides network access.
- **Proxy Server Port**: The port number forwards network connection attempts to the Remote Manager server. Obtain these values from your Remote Manager server administrator.

Advanced connectivity settings

The default settings for Remote Manager usually work for most situations. The Advanced settings configure the idle timeout for the connection between XBee Gateway and Remote Manager, and the keep-alive settings of the various interfaces (TCP and HTTP for mobile and Ethernet network connections). Only change these settings when the defaults settings do not work properly.

Protocol

Reconnection delay (seconds): This setting controls whether to automatically reconnect to Remote Manager after being disconnected and waiting for the specified amount of time. The time is measured in seconds.

Choose the **Never reconnect** option if you do not want to automatically reconnect to Remote Manager after a disconnect.

Disconnect inactivity time (seconds): Enables or disables the idle timeout for the Remote Manager connection between device and server. The idle timeout is enabled by default. Specifying "**none**" disables the idle timeout. Specifying a timeout value enables the idle timeout, which means the connection will be dropped after the specified number of seconds. The minimum value is 300 and the maximum 43200.

In contrast to TCP keep-alives, the timeout managed by the "**connidletimeout**" option is at the Remote Manager application level. The "**connidletimeout**" option provides a way to close the connection to the Remote Manager server if no Remote Manager protocol data is sent or received within a specified time frame. That is, the connection is idle with no traffic in or out for that amount of time. This capability is particularly useful for server-initiated connections. When a user on the server side requests a connection be established to a device, that user needs to explicitly terminate the connection when they are done with the device. This timeout allows you to configure the device so that a "forgetful user" does not inadvertently leave the connection in place, which could cost money on a cellular connection if Connectware or TCP keepalives are enabled and transferred needlessly between device and server.

Enable protocol compression: Configures whether RCI command and response text is compressed, when both are passed between the Digi device and the Remote Manager server. This compression primarily affects the size of the data passed when settings or state information are formatted as RCI and conveyed between device and server. Using compression on this RCI text can reduce the size of passed data, and, for cellular products, reduce the cost of reading and writing device settings. When you enable RCI compression, the RCI command and response text is compressed using LIBZ compression when it is sent between device and server. The protocol used to manage and pass data between devices and Remote Manager, known as EDP, internally negotiates whether compression is

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 122 / 177

applied. RCI compression is enabled, or “on” by default to reduce byte count and cost of sending data. As an example of savings, typical cellular router settings will compress to about 8% of its original size, which means that you can send data in far fewer packets and less time, than an uncompressed version of the same data. Only disable RCI compression for technical support and troubleshooting purposes. For example, if you want to eliminate the possibility that this compression is causing some sort of problem.

Socket

Enable TCP no delay: Configures whether use of the TCP no delay option is disabled by default for the Remote Manager connection between device and server, when configuring the device's TCP socket endpoint for that connection. The default is disabled. This default reduces the number of packets sent when the Remote Manager connection is established between device and server. While there is a very slight penalty in terms of added latency, that penalty is very small compared to the relative high latencies for cellular network communications. Reducing the packet count reduces the number of bytes exchanged over the cellular connection, which saves money. The typical start-up data count is reduced from about 7 KB to 4 KB by disabling TCP no delay. The ability to turn on the TCP No delay option is provided for technical support and troubleshooting purposes.

Enable TCP keep-alive: Enables or disables the ability to send TCP keep-alive packets over the client-initiated connection to the Remote Manager server, and whether the device waits before dropping the connection. The default is enabled.

Keep-alive Ethernet and Keep-alive Mobile

These settings control how often keep-alive packets are sent over the device-initiated connection to Remote Manager, and whether the Remote Manager-registered device waits before dropping the connection. Keep-alives for the Remote Manager connection serve three basic purposes:

1. Keep the Remote Manager connection alive through network infrastructure such as routers, NATs and firewalls.
2. Inform the other (remote) side of the Remote Manager connection that its peer is still active.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 123 / 177

3. Test the Remote Manager connection to verify whether or not it stopped responding and should be abandoned. Recovery actions are taken as configured in other settings. The Remote Manager-registered device and Remote Manager each perform their own independent monitoring of the Remote Manager connection state (active, idle and missed keep-alives). If Remote Manager protocol messages or data other than keepalives is exchanged over the Remote Manager connection, the idle timers that trigger keep-alives are reset, and the consecutive missed keep-alive counts are cleared to zero.
   - **Device send keep-alive interval**: Specifies how frequently the device sends a keep-alive packet to Remote Manager if the Remote Manager connection is idle. Remote Manager expects to receive either Remote Manager protocol messages or keep-alive packets from the device at this interval.
   - **Server Send Interval**: Specifies how frequently the Remote Manager-registered device sends a keep-alive packet to Remote Manager if the Remote Manager connection is idle. Remote Manager expects to receive either Remote Manager protocol messages or keep-alive packets from the Remote Manager-registered device at this interval.
   - **Maximum consecutive missed keep-alives**: After missing the number of consecutive expected keep-alives specified by this setting, according to the configured intervals, the connection is considered lost and is closed by the device and Remote Manager.

Note The best practice is to set this interval value as long as your application can tolerate to reduce the amount of data traffic.

Advanced connectivity settings for the web interface

The default settings for Remote Manager usually work for most situations. The Advanced settings configure the idle timeout for the connection between XBee Gateway and Remote Manager, and the keep-alive settings of the various interfaces (TCP and HTTP for mobile and Ethernet network connections). Only change these settings when the defaults settings do not work properly.

- **Use an HTTP proxy to connect to Remote Manager** (Web interface only): Configures XBee Gateway to connect to Remote Manager using HTTP over proxy. You can create path to a Remote Manager server through a local HTTP proxy, such as squid, provided that you use the server to simply remap the target IP address and port number, without extra authentication or other security measures.
- **Proxy Server URL**: The URL of the system that provides network access. Obtain this value from your Remote Manager server administrator.
- **Proxy Server Port**: That port number forwards network connection attempts to the Remote Manager server. Obtain this value from your Remote Manager server administrator.
- **Protocol**: The protocol used to configure several aspects of Remote Manager connection and protocol management.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 124 / 177

- **Reconnection delay**
  Reconnection delay: n seconds:

  These settings control whether to automatically reconnect to Remote Manager after being disconnected and waiting for the specified amount of time.

  If you do not want to automatically reconnect to Remote Manager after a disconnect:
  - From Remote Manager, choose **Never reconnect**.
  - From the web interface, clear the **Reconnection delay** check box.
- **Disconnect after inactivity period**
  Inactivity time: n seconds:

  Enables or disables the idle timeout for the Remote Manager connection between device and server. The idle timeout is enabled by default. Specifying "**none**" disables the idle timeout. Specifying a timeout value enables the idle timeout, which means the connection will be dropped after the specified number of seconds. The minimum value is 300 and the maximum 43200. In contrast to TCP keep-alives, the timeout managed by the "**connidletimeout**" option is at the Remote Manager application level. The "**connidletimeout**" option provides a way to close the connection to the Remote Manager server if no Remote Manager protocol data is sent or received within a specified time frame. That is, the connection is idle with no traffic in or out for that amount of time. This capability is particularly useful for server-initiated connections. When a user on the server side requests a connection be established to a device, that user needs to explicitly terminate the connection when they are done with the device. This timeout allows you to configure the device so that a "forgetful user" does not inadvertently leave the connection in place, which could cost money on a cellular connection if Connectware or TCP keepalives are enabled and transferred needlessly between device and server.
- **Enable protocol compression**: Configures whether RCI command and response text is compressed, when both are passed between the Digi device and the Remote Manager server. This compression primarily affects the size of the data passed when settings or state information are formatted as RCI and conveyed between device and server. Using compression on this RCI text can reduce the size of passed data, and, for cellular products, reduce the cost of reading and writing device settings. When you enable RCI compression, the RCI command and response text is compressed using LIBZ compression when it is sent between device and server. The protocol used to manage and pass data between devices and Remote Manager, known as EDP, internally negotiates whether compression is applied. RCI compression is enabled, or "on" by default to reduce byte count and cost of sending data. As an example of savings, typical cellular router settings will compress to about 8% of its original size, which means that you can send data in far fewer packets and less time, than an uncompressed version of the same data. Only disable RCI compression for technical support and troubleshooting purposes. For example, if you want to eliminate the possibility that this compression is causing some sort of problem.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- **Socket**: Configuration settings for the device's TCP socket.
  - **Enable TCP no delay**: Configures whether use of the TCP no delay option is disabled by default for the Remote Manager connection between device and server, when configuring the device's TCP socket endpoint for that connection. The default is disabled. This default reduces the number of packets sent when the Remote Manager connection is established between device and server. While there is a very slight penalty in terms of added latency, that penalty is very small compared to the relative high latencies for cellular network communications. Reducing the packet count reduces the number of bytes exchanged over the cellular connection, which saves money. The typical start-up data count is reduced from about 7 KB to 4 KB by disabling TCP no delay. The ability to turn on the TCP No delay option is provided for technical support and troubleshooting purposes.
  - **Enable TCP keep-alive**: Enables or disables the ability to send TCP keep-alive packets over the client-initiated connection to the Remote Manager server, and whether the device waits before dropping the connection. The default is enabled.

- **Keep Alives: Ethernet**
  Keep Alives: WiFi

  These settings control how often keep-alive packets are sent over the device-initiated connection to Remote Manager, and whether the Remote Manager-registered device waits before dropping the connection. Keep-alives for the Remote Manager connection serve three basic purposes:

  1. Keep the Remote Manager connection alive through network infrastructure such as routers, NATs and firewalls.
  2. Inform the other (remote) side of the Remote Manager connection that its peer is still active.
  3. Test the Remote Manager connection to verify whether or not it stopped responding and should be abandoned. Recovery actions are taken as configured in other settings. The Remote Manager-registered device and Remote Manager each perform their own independent monitoring of the Remote Manager connection state (active, idle and missed keep-alives). If Remote Manager protocol messages or data other than keepalives is exchanged over the Remote Manager connection, the idle timers that trigger keep-alives are reset, and the consecutive missed keep-alive counts are cleared to zero.

  The **interval** settings are used with the **Assume connection is lost after n timeouts** setting to signal when the connection has been lost.

  - **Device Send Interval**: Specifies how frequently the device sends a keep-alive packet to Remote Manager if the Remote Manager connection is idle. Remote Manager expects to receive either Remote Manager protocol messages or keep-alive packets from the device at this interval.
  - **Server Send Interval**: Specifies how frequently the Remote Manager-registered device sends a keep-alive packet to Remote Manager if the Remote Manager connection is idle. Remote Manager expects to receive either Remote Manager protocol messages or keep-alive packets from the Remote Manager-registered device at this interval.

  Note The best practice is to set this interval value as long as your application can tolerate to reduce the amount of data traffic.

- **Assume connection is lost after n timeouts (Wait Count)**: After missing the number of consecutive expected keep-alives specified by this setting, according to the configured intervals, the connection is considered lost and is closed by the device and Remote Manager.

Device Cloud client initiated connection page

You can use the settings on this page to enable Remote Manager and specify reconnect timeout settings.

Connection enable

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Enables or disables the connection from XBee Gateway to the Remote Manager server. Disable this feature if you have no use for Remote Manager, and want to eliminate any Remote Manager-related network traffic.

Connection reconnect timeout (seconds)

These settings control whether to automatically reconnect to Remote Manager after being disconnected and waiting for the specified amount of time.

If you do not want to automatically reconnect to Remote Manager after a disconnect, choose **Never reconnect**.

Note From the web interface, clear the **Reconnection delay** check box.

Device Cloud Configuration page

The default settings for Remote Manager usually work for most situations. You can configure the idle timeout for the connection between XBee Gateway and Remote Manager, and the keep-alive settings of the various interfaces (TCP and HTTP for mobile and Ethernet network connections). Only change these settings when the defaults settings do not work properly.

Connection Type

Leave this set to **SSL**, which is the default option.

Server List

Up to four servers can be configured in the server list. The value for this setting is generally a Fully Qualified Domain Name (FQDN) pointing to one of the Remote Manager servers. Obtain this value from your Remote Manager server administrator. Typically this administrator is Digi.

The default value for **Server List: 1** is my.devicecloud.com.

Server TCP Port

The network port number for the Remote Manager server. The default value is 3199.

Proxy server address

This setting specifies the URL of the system that provides network access.

The **Proxy server address** works in conjunction with the **Proxy server TCP port** field. These settings configure XBee Gateway to connect to Remote Manager using HTTP over proxy. You can create a path to a Remote Manager server through a local HTTP proxy, such as squid, provided that you use the server to simply remap the target IP address and port number, without extra authentication or other security measures.

Proxy server TCP port

The port number forwards network connection attempts to the Remote Manager server. Obtain these values from your Remote Manager server administrator.

Connection idle timeout (seconds)

Enables or disables the idle timeout for the Remote Manager connection between device and server. The idle timeout is enabled by default. Specifying **Disabled** disables the idle timeout. Specifying a timeout value enables the idle timeout, which means the connection will be dropped after the specified number of seconds. The minimum value is 300 and the maximum 43200.

Protocol compression enable

Configures whether RCI command and response text is compressed, when both are passed between the Digi device and the Remote Manager server. This compression primarily affects the size of the data passed when settings or state information are formatted as RCI and conveyed between device and server. Using compression on this RCI text can reduce the size of passed data, and, for cellular products, reduce the cost of reading and writing device settings. When you enable RCI compression, the RCI command and response text is compressed using LIBZ compression when it is sent between

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

device and server. The protocol used to manage and pass data between devices and Remote Manager, known as EDP, internally negotiates whether compression is applied. RCI compression is enabled, or “on” by default to reduce byte count and cost of sending data. As an example of savings, typical cellular router settings will compress to about 8% of its original size, which means that you can send data in far fewer packets and less time, than an uncompressed version of the same data. Only disable RCI compression for technical support and troubleshooting purposes. For example, if you want to eliminate the possibility that this compression is causing some sort of problem.

TCP no delay enable

Configures whether use of the TCP no delay option is disabled by default for the Remote Manager connection between device and server, when configuring the device's TCP socket endpoint for that connection. The default is disabled. This default reduces the number of packets sent when the Remote Manager connection is established between device and server. While there is a very slight penalty in terms of added latency, that penalty is very small compared to the relative high latencies for cellular network communications. Reducing the packet count reduces the number of bytes exchanged over the cellular connection, which saves money. The typical start-up data count is reduced from about 7 KB to 4 KB by disabling TCP no delay. The ability to turn on the TCP No delay option is provided for technical support and troubleshooting purposes.

TCP keep alives enable

Enables or disables the ability to send TCP keep-alive packets over the client-initiated connection to the Remote Manager server, and whether the device waits before dropping the connection. The default is enabled.

Device Cloud network type page

Keep-alive Ethernet and Keep-alive Mobile

These settings control how often keep-alive packets are sent over the device-initiated connection to Remote Manager, and whether the Remote Manager-registered device waits before dropping the connection. Keep-alives for the Remote Manager connection serve three basic purposes:

1. Keep the Remote Manager connection alive through network infrastructure such as routers, NATs and firewalls.
2. Inform the other (remote) side of the Remote Manager connection that its peer is still active.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 129 / 177

3. Test the Remote Manager connection to verify whether or not it stopped responding and should be abandoned. Recovery actions are taken as configured in other settings. The Remote Manager-registered device and Remote Manager each perform their own independent monitoring of the Remote Manager connection state (active, idle and missed keep-alives). If Remote Manager protocol messages or data other than keepalives is exchanged over the Remote Manager connection, the idle timers that trigger keep-alives are reset, and the consecutive missed keep-alive counts are cleared to zero.
   - **Device send keep-alive interval**: Specifies how frequently the device sends a keep-alive packet to Remote Manager if the Remote Manager connection is idle. Remote Manager expects to receive either Remote Manager protocol messages or keep-alive packets from the device at this interval.
   - **Server Send Interval**: Specifies how frequently the Remote Manager-registered device sends a keep-alive packet to Remote Manager if the Remote Manager connection is idle. Remote Manager expects to receive either Remote Manager protocol messages or keep-alive packets from the Remote Manager-registered device at this interval.
   - **Maximum consecutive missed keep-alives**: After missing the number of consecutive expected keep-alives specified by this setting, according to the configured intervals, the connection is considered lost and is closed by the device and Remote Manager.

Note The best practice is to set this interval value as long as your application can tolerate to reduce the amount of data traffic.

Connect to a different instance of Remote Manager

To connect to a different instance of a Remote Manager:

1. Access the XBee Gateway web interface.
2. Click **Configuration** > **Device Cloud Connectivity**.
3. On the Remote Manager Configuration page, in the **Device Cloud Server** setting, select **Other...**.
4. In the **Server URL** setting, type the name of the different instance of Remote Manager; for example, **remote-manager.example.com**.
5. In the **Server Port** field, type the network port number to be used for this Remote Manager instance.
6. Click **Apply**.

Configure a proxy server

To configure the proxy server:

1. Access the XBee Gateway web interface.
2. Click **Configuration** > **Device Cloud Connectivity**.
3. From the **Device Cloud Configuration** page, click **Advanced Settings**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

4. Select **Use an HTTP proxy to connect** to Remote Manager and complete the fields.

Tip Contact your network administrator for assistance in configuring a proxy server.

Network services settings

You can use the Network Services settings to enable or disable common network services that are available on XBee Gateway, and configure the network port on which the service is listening. You can also disable certain services so the device runs only those services specifically needed and to improve device security.

Note This is available for Cellular models only.

Configure network services settings

To configure network settings, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. Click **Network Services**.
4. Complete the fields and click **Save** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Click **Configuration** > **Network Services**. The **Network Service Configuration** page appears.
3. Choose one of the following options:
   - To enable a network service, select the check box next to the service and type a port number in the **TCP Port** field.
   - To disable a network service, clear the check box next to the service.
4. Select the one of the following modes from the **Device Discovery Services ADDP Mode** drop-down list:
   - **Read-Write**: Allows discovery of devices and the ability to change network settings through the Digi Device Discovery utility. This is the default setting on firmware versions 3.2.29.x and earlier.
   - **Read-Only**: Allows discovery of devices only. This is the default setting on firmware versions 3.2.30.x and later.
   - **Off**: Turns off the ADDP network service. This setting completely closes the network port used for device discovery.
5. Click **Apply** to save your changes.

Network Services Configuration page

The **Network Services Configuration** page allows you to enable or disable the network services as needed. It also allows you to control how Digi devices are discovered.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

The following table describes each service and its default TCP port number.

Tip Use the default TCP port numbers for these services because they are well-known by most applications.

Setting	Services provided	Default TCP Port Number
Enable Secure Shell Server (SSH)	Secure Shell Server (SSH) allows users secure access to sign in to the Digi device and access the command-line interface. Essentially, pulling content from the XBee Gateway web interface.	22
Enable Web Server (HTTP)	HyperText Transfer Protocol (HTTP), also known as Web Server, provides access to web pages for configuration and web services. HTTP and HTTPS (see the **Enable Secure Web Server (HTTPS)** definition) are also referred to as Web Server or Secure Web Server. These services control the use of the web interface. If HTTP and HTTPS are disabled, device users cannot use the web interface to configure, monitor, and administer the device.	80
Enable Secure Web Server (HTTPS)	HyperText Transfer Protocol over Secure Socket Layer (HTTPS), also known as Secure Web Server, uses encryption to improve the security of web data transfers.	443
Device Discovery Service (ADDP) Mode	Device Discovery Service handles discovery of Digi devices on a network, using a Digi-proprietary protocol called ADDP and the Digi Device Discovery utility. See Access the XBee Gateway web interface for more information. The Device Discovery Service also allows you to change network settings. The Device Discovery Service can also be completely disabled. The settings for this network service are as follows: ■ **Read-Write**: Allows you to discover devices and change network settings through the Digi Device Discovery utility. This is the default setting on firmware versions 3.2.29.x and earlier. ■ **Read-Only**: Allows you to discover of devices only. This is the default setting on firmware versions 3.2.30.x and later. ■ **Off**: Turns off the ADDP network service. This setting completely closes the network port used for device discovery.	2362

Host Name Configuration

- **Host Name**: The host name to be placed in the DHCP Option 12 field. This is an optional setting that is only used when DHCP is enabled.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

The host name is validated and must contain only specific characters. These restrictions are as defined in RFCs 952, 1035, 1123 and 2132. The following characters are allowed:

- Alphabetic: upper and lower case letters A through Z and a through z
- Numeric: digits 0 through 9
- Hyphen (dash): -
- Period (dot): .

You can specify a single name or a fully qualified domain name, whose parts are separated with a period character, as the host name value. Each part must comply the following rules:

- Must begin with a letter or digit
- Must end with a letter or digit
- Interior characters may be a letter, digit or hyphen
- Each part of the name may be from 1 to 63 characters in length, and the full host name may be up to 127 characters in length. An IP address is not permitted for use in this host name setting.

Domain Name Service Configuration

These settings are the two Domain Name System servers to be used as static servers when dynamic mechanisms do not supply enough DNS servers.

The IP addresses of Domain Name Servers (DNS) used to resolve computer host names to IP addresses. Static DNS servers are specified independently of any network interface and its connection state. An IP address of 0.0.0.0 indicates no server is specified.

- **Primary DNS**: The primary DNS server.
- **Secondary DNS**: The second DNS server to used if the primary DNS fails to respond.

GPS static position settings

You can use the settings in the **GPS status position** page to configure GPS support for XBee Gateway.

Configure GPS Static Position settings

To configure GPS Static Position settings, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. Select **Advanced Configuration** > **GPS Static Position**.
3. Complete the fields in the **GPS Static Position** page.
4. Click **Save** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Click **Configuration** > **GPS Static Position**.
3. Complete the fields under **GPS Static Position**.
4. Click **Apply** to save your changes.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
㈜테솔 · www.tessol.com TS-TL-DGI-049 133 / 177
KOLAS 국제공인교정기관 · ISO/IEC 17025

GPS Static Position page

The **GPS Static Position** page allows you to configure the position of a Digi device.

- **Enable use of the static position**: Enables or disables the position for a static XBee Gateway.
- **Latitude**: Defines the latitude component of the Digi device, in degrees. The value can range from -90.0 to 90.0 degrees.
- **Longitude**: Defines the longitude component of the Digi device, in degrees. The value can range from -180.0 to 180.0 degrees.

Time settings

XBee Gateway uses Network Time Protocol (NTP) for time synchronization. Using NTP requires an external NTP time server. Time synchronization is critical to the security of the device, including validating the certificates that sign firmware update images, as well as to verify the server certificate when connecting to Remote Manager. Steps are taken to preserve a sense of the time across reboots, but the availability of an NTP server or servers is important to the long-term health of the device.

In environments where the device cannot directly connect to the Internet, you need to configure the time server setting to point to a local NTP server when accurate long-term time is required. Most users do not need to change the time server setting. If the Digi device is already connected to Remote Manager, you can adjust the time server configuration from Remote Manager.

The default time settings are sufficient for most users. See Default behavior regarding NTP time server access for more information about default behavior.

Configure time settings

To configure time settings, choose one of the following options:

From Remote Manager

1. Click the **Device Management** tab.
2. From the device list, double-click the device to display the device properties menu.
3. For the XBee Gateway Cellular model:
   a. Select **Time**.
   b. Complete the fields and click **Save** to save your changes.
4. For the XBee Gateway Wi-Fi model:
   a. Select **Advanced Configuration** > **Time server**.
   b. Complete the fields and click **Save** to save your changes.
   c. Select **Advanced Configuration** > **Time zone**.
   d. Complete the fields and click **Save** to save your changes.

From the XBee Gateway web interface

1. Access and log into the web interface.
2. Click **Configuration** > **Time** to access the network services settings.
3. Complete the fields and click **Apply** to save your changes.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 134 / 177

TESSOL Technical Library
TS-TL-DGI-049

Time Server Configuration page

- **Time server synchronization enable**: When you select this setting, XBee Gateway uses the Network Time Protocol (NTP) to keep system time synchronized to specified time servers.
- **NTP Time Precision**: Controls how often XBee Gateway updates time information from its NTP servers. Options are:
  - **Standard NTP Time Precision**: XBee Gateway only synchronizes time with the servers once every 24 hours. This option trades time precision for network utilization and is most appropriate for cellular or other bandwidth-constrained devices.
  - **High NTP Time Precision**: XBee Gateway synchronizes time on a dynamic schedule determined by the NTP client to maintain time precision compliant to the NTP standards.
- **NTP Server 1|2|3|4**: These settings configure the various Network Time Protocol (NTP) servers that XBee Gateway uses to obtain current date and time.

  For XBee Gateway Ethernet and Wi-Fi models, you can specify up to **four** NTP server settings to be used as upstream servers in synchronizing time.

  The default settings for the four NTP server settings are as follows:
  - **NTP server 1**: 0.time.digi.com
  - **NTP server 2**: 1.time.pool.ntp.org
  - **NTP server 3**: 1.idigi.pool.ntp.org
  - **NTP server 4**: 2.idigi.pool.ntp.org

  Configure the XBee Gateway cellular models to use the top NTP Server entry (**NTP Server 1**) entry, and leave the others blank because XBee Gateway checks all NTP servers that are configured for time-drift. Configuring four NTP time servers for an XBee Gateway cellular device would result in excessive and unnecessary cellular usage.

Time Zone Configuration page

Timezone: Specify the times zone for the device. The default setting is Coordinated Universal Time (UTC).

Time Configuration page

Network Time Protocol (NTP) settings

- **Enable Time Server Synchronization**: When you select this setting, XBee Gateway uses the Network Time Protocol (NTP) to keep system time synchronized to specified time servers.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- **NTP Time Precision**: Controls how often XBee Gateway updates time information from its NTP servers. Options are:
  - **Standard NTP Time Precision**: XBee Gateway only synchronizes time with the servers once every 24 hours. This option trades time precision for network utilization and is most appropriate for cellular or other bandwidth-constrained devices.
  - **High NTP Time Precision**: XBee Gateway synchronizes time on a dynamic schedule determined by the NTP client to maintain time precision compliant to the NTP standards.
- **NTP Server 1|2|3|4**: These settings configure the various Network Time Protocol (NTP) servers that XBee Gateway uses to obtain current date and time.

  For XBee Gateway Ethernet and Wi-Fi models, you can specify up to **four** NTP server settings to be used as upstream servers in synchronizing time.

  The default settings for the four NTP server settings are as follows:
  - **NTP server 1**: 0.time.digi.com
  - **NTP server 2**: 1.time.pool.ntp.org
  - **NTP server 3**: 1.idigi.pool.ntp.org
  - **NTP server 4**: 2.idigi.pool.ntp.org

  Configure the XBee Gateway cellular models to use the top NTP Server entry (**NTP Server 1**) entry, and leave the others blank because XBee Gateway checks all NTP servers that are configured for time-drift. Configuring four NTP time servers for an XBee Gateway cellular device would result in excessive and unnecessary cellular usage.

Time settings

Note To set the time, you must first disable **Enable Time Server Synchronization** setting.

Set Time: Configures the hours, minutes, seconds, month, day, and year on XBee Gateway.

Timezone settings

Timezone: The default setting is Coordinated Universal Time (UTC).

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Configure XBee network settings

XBee Gateway provides a gateway between Internet Protocol (IP) network devices and a network of ZigBee wireless devices (which includes Digi XBee modules). Typically, these wireless devices are small sensors and controllers. Remote nodes in an XBee network can include other XBee ZigBee nodes.

You can configure the XBee module as a coordinator or router in a ZigBee network. For complete XBee module settings and their descriptions, and discussions of XBee network concepts, see the *XBee/XBee-PRO S2C ZigBee RF Module User Guide*.

When working with XBee networks, the following related documents are helpful:

- For complete XBee module settings and their descriptions, and discussions of XBee network concepts, see the *XBee/XBee-PRO® ZB RF Modules User Guide*.
- The *Digi Remote Manager User Guide*.

Configure XBee Networks page in Remote Manager

You can use the **XBee Networks** page in Remote Manager to manage all the XBee nodes in your inventory.

The *Digi Remote Manager User Guide* describes the settings and operations that you can perform from the XBee Networks pages and menus.

1. Log into Remote Manager.
2. Click the **Device Management** tab.
3. Click the **XBee Networks** menu. The **XBee Networks** page appears.
4. Display the **Properties** page for the selected XBee node using one of the following methods:
   - Double-click an XBee node on the **XBee Networks** page.
   - Right-click the node and then select **Properties**.
   - Click the node and then click the **Properties** button on the toolbar. If you select multiple devices, a **Properties** page opens for each device that you selected.
5. Click **Basic** and complete the fields. The basic settings control the basic operation of the XBee module in the XBee network. See the AT commands topic in the *XBee/XBee-PRO® S2C Zigbee® RF Module User Guide* for more information about the settings on this page.
6. Click **Advanced** and complete the fields. The advanced radio settings control the behavior of the XBee module at a more detailed level. See the AT commands topic in the *XBee/XBee-PRO® S2C Zigbee® RF Module User Guide* for more information about the settings on this page.
7. Complete the fields and click **Save** to save your changes.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Configure XBee network settings in the web interface

The **XBee Configuration** page in the XBee Gateway web interface allows you to configure each of the XBee devices joined to your network.

1. Access and log into the web interface.
2. Click **Configuration** > **XBee Network**. The **XBee Configuration** page appears.
3. Click **XBee Devices** and complete the fields. See XBee Configuration page for more information.
4. Click the **Node ID**, **Network Address**, or **Extended Address** field for an XBee node. The **Device Details** page appears.
5. Complete the fields under each of the following sections on the **Device Details** page. See Device Details page for more information.
   - **Addressing Settings**
   - **Radio Settings**
   - **Network Settings**
   - **Serial Settings**
   - **Input/Output Settings**
6. Repeat steps 3 and 4 for each additional XBee node.
7. Complete the fields under **Network Settings** and click **Apply** to save your changes.

XBee Configuration page

The **XBee Configuration** page in the XBee Gateway web interface allows you to configure each of the XBee devices joined to your network.

XBee Devices section

This section provides information on the XBee RF modules on your local XBee Gateway and on remote XBee devices.

XBee Device on the Gateway section

This section shows current settings for the XBee RF module in XBee Gateway. The displayed XBee RF module information includes:

- **Node ID**: A descriptive, user-friendly name of your choice for the device. The Node ID is a 20-byte printable ASCII string that allows for referencing devices by names rather than their physical addresses.
- **Network Address**: The 16-bit network address for the device.
- **Extended Address**: A unique static 64-bit address for the device.
- **Node Type**: The node type for the device, or role it plays in the XBee network. The possible roles are coordinator, router, or end device.
- **Product Type**: A description of the product type for the node, such as “XBee Gateway.”

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

To display more information on the XBee RF module on XBee Gateway, click the **Node ID**, **Network Address**, or **Extended Address** field. The Device Details page appears. See Device Details page for more information.

Remote XBee Devices section

This section shows information on the remote XBee RF modules in your XBee network, or nodes. Each node displays information on the Node ID, Network Address, Extended Address, Node Type, and Product Type.

Devices that appear in the list that are known to the gateway. The list accumulates known devices over time. To find new devices, click **Discover XBee Devices**. Devices that respond to this query will appear in list as a known device.

To clear the list of known devices and discover new devices, click **Clear list before discovery**. In this instance, only devices that responded to the active discovery will appear in the list on completion of the device discovery operation.

OTA Firmware Update Setup section

This section displays settings for updating firmware on the XBee RF modules on remote XBee devices or nodes. This type of firmware update is known as an OTA firmware update. For more information, see XBee network OTA firmware updates.

OTA Firmware Update section

This section displays the status of the OTA firmware updates that were configured on the OTA Firmware Update page. For more information, see OTA Firmware Update page.

Device Details page

To display the **Device Details** page, click the **Node ID**, **Network Address**, or **Extended Address** field for an XBee node. The **Device Details** page displays configuration information for the XBee RF module on the gateway or nodes.

The **Return to Network View** link in the upper-right corner of the page returns you to the **XBee Configuration** page and displays the XBee Devices in a ZigBee network.

The **Device Details** page is organized by key groupings of parameters, or radio settings. The settings and information displayed on the page can vary by XBee modules, whether the XBee modules are on XBee Gateway or on nodes, and whether the XBee module supports various parameters. Common parameters include the PAN ID, firmware and hardware versions, and the device type identifier. In the *XBee®/XBee-PRO® ZB RF Modules Product Manual*, settings are referred to by their AT command name, which is in parentheses on the settings on the following pages; for example, **ID**, **SC**, **NJ**, **EE**, **SP**.

The details shown on **Device Details** page are similar to the configuration options you will find in XCTU. XBee Gateway allows you to read and configure the settings of your XBee network nodes remotely.

- **Network Settings** allows you to configure the basic elements of a ZigBee network, including the **Extended PAN ID** used for starting or joining a network, and other parameters used for starting or joining a network.
- **Addressing Settings** allows you to configure the addressing and routing behavior for the XBee module in a ZigBee network.
- **Radio Settings** allows you to control the security, sleep mode, and RF serial interfacing for the XBee RF module.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 139 / 177

- **Serial Settings** allows you to configure the serial interfacing parameters for the XBee RF module. This section appears for remote nodes only. These settings must match the serial interface for the device attached to the XBee serial port that you are configuring.
- **Input/Output Settings** allows you to configure the I/O parameters for the XBee RF module. This section appears for remote nodes only. The **I/O Pin Settings** section shows the pin settings for the XBee RF module. For detailed description of these pin settings, see the *Product Manual* for the XBee or XBee-PRO RF module in your product.
- For the **I/O Pin Settings**, the **Pull-up/down Direction (PD)** parameter appears when the device supports this feature. If the device has the **Pull-up/down Direction (PD)** parameter, the title for the fifth table header in the display is **Pull up/down**, otherwise the title is **Pull up**.

Device Status page

The **Device Status** page displays status information for a node. The parameters displayed on the page vary based on the capabilities supported by the node's XBee module. Common parameters include the PAN ID, firmware and hardware versions, and the device type identifier. For a detailed description of these parameters, see the *XBee/XBee-PRO ZigBee RF Module User Guide* for the XBee or XBee-PRO RF module in your product. The **Refresh** button refreshes the display of status parameters.

Device Operations page

The **Device Operations** page allows you to perform several tasks on nodes. The operations displayed depend on the network type and node type.

The **Identify Device** operation causes the node to flash its association LED for a specified amount of time. Use this operation when locating a node among a large array of nodes. Specify the amount of time and click **Identify Device**.

The **Reset Device** operation allows you to choose one of the reset device operations for all nodes except the gateway:

- **Software Reset**: A software reset resets the device without using the hardware reset button/function. If you modified the scan channels or PAN ID since the last reset, a network reset occurs. The XBee module performs this operation by executing the AT command **FR**.
- **Network Reset**: A network reset will cause the device to reset its network configuration information, reset, and rejoin a network. This operation is performed in the XBee module by executing the AT command **NR=0**.

CAUTION! The node may no longer be accessible from this gateway after a network reset.

The **Backup and Restore Configuration** operation allows you to save a backup file of the XBee RF module configuration settings for nodes and restore the configuration settings if the need arises.

- **Backup**: The **Backup** operation saves the node's XBee RF module configuration settings to a file. The resulting backup file is a .pro file that is compatible with the XCTU configuration tool. This means that you can save or load backup files from the XBee RF module using XCTU as well as the gateway's command line or web interfaces.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 140 / 177

- **Choose File**: Provide the path to the backup file with the .pro extension.
- **Restore**: The **Restore** operation sets the node's XBee RF module configuration settings to those in the specified .pro file.

CAUTION! A restore operation may cause the device to reset its network information, reset, and rejoin a network. It may no longer be accessible from this gateway.

XBee network OTA firmware updates

The XBee Gateway firmware supports an OTA (Over the Air) firmware update in the XBee network nodes. As XBee networks can involve a large number of nodes, Digi provides a way to automatically schedule XBee Gateway firmware updates and manage firmware files.

OTA firmware update files are available for downloading from the Digi Support site. Go to the firmware update page for the type of XBee ZigBee modules that you want to update. The files must have the extension .ebl.

Update the XBee network node firmware (OTA updates) from Remote Manager

You must enable OTA (Over the Air) firmware updates on the device and download the firmware before you can apply the firmware update to the device.

Step 1: Enable OTA Firmware updates on a device

Before you can perform an OTA firmware update, you must enable that option.

1. Log in to Remote Manager.
2. Click the **Device Management** tab.
3. Select the device on which you want to enable OTA firmware updates and automatic firmware updates.
4. Right-click on the selected device and choose **Properties**.
5. Choose **Advanced Configuration** > **XBee**.
6. Enable the **OTA firmware updates** setting by selecting the **On** option.
7. Enable the **Automatic OTA updates** setting by selecting the **On** option.
8. Click **Save** to save the changes.

Step 2: Download the firmware

Download the appropriate firmware from the XBee Gateway product support page.

Step 3: Apply the firmware update

1. Log in to Remote Manager.
2. Click the **Device Management** tab.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 141 / 177

3. Select one or more devices from the device list that you want to apply firmware updates to, right-click, and select **Firmware > Update XBee Node Firmware**.
4. Type or browse to the file name containing the firmware update.
5. Click **Update Firmware**. The XBee Gateway or XBee node reboots automatically after the firmware is downloaded to the device.

Update the XBee node firmware (OTA updates) from the web interface

To perform OTA firmware updates from the web interface:

1. Download the appropriate firmware file from Digi.
2. Access and log into the web interface.
3. Click **Configuration** > **XBee Network**. The **XBee Configuration** page appears.
4. Click **OTA Firmware Update Setup**. The **OTA Firmware Update Setup** page appears.
5. Click **Choose File** and browse to the firmware update file. The files must have the extension .ebl. You can upload multiple files, each containing a different firmware type needed by nodes on the network.
6. Click **Upload**.

Note The XBee network cannot access a remote node while the remote node is updating its firmware. XBee Gateway cannot access the XBee module while the XBee module is updating its firmware.

Note that you can also schedule and monitor updates of individual nodes on the **OTA Firmware Update Status** page. Each scheduled update runs in the background on one node at a time. See OTA Firmware Update Setup page for more information.

OTA Firmware Update Setup page

You can use the **OTA Firmware Update Setup** page in the web interface to enable automatic firmware updates, uploading XBee Gateway firmware image files, and management of XBee Gateway firmware files.

The settings in the following sections control how gateway XBee firmware updates are performed:

Update Settings section

- **Enable over the air firmware updates**: Enable firmware updates on remote nodes over the XBee network. Firmware updates use a background process to query remote nodes for their current firmware version, and update their firmware from files stored on the gateway. By disabling this process, you can suspend firmware updates. You may want to suspend updates if the update process interferes with applications using the network.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- **Automatically update nodes to the latest firmware version**: When a node reports its firmware version, and a newer version of firmware is available on the gateway, schedule a firmware update without user action. Use this option to automatically update nodes as they join the network. If you do not select this option, you can manually schedule firmware updates from the Firmware Update Status page.
- **Stop automatic updates if an update error occurs**: If an error occurs while updating a node, suspend further updates of other nodes. You can resume updates by clicking Apply on this page.

Upload Files section

This section controls the upload XBee Gateway firmware files to the gateway. These files contain the firmware image used to update nodes on the XBee network. You can upload multiple files, where each contains a different firmware type and version. Firmware files must end with an **.ebl** extension. Click **Browse** to select a firmware file and then click **Upload**.

Manage Files section

This section lists the firmware files uploaded to the Digi device, along with their type and version number. You can remove these files from the gateway after all nodes have been updated. To delete firmware files, select the check box next to each firmware file that you want to delete and then click **Delete**.

OTA Firmware Update page

The **OTA Firmware Update** page in the web interface displays the status of XBee Gateway firmware updates for nodes, and allows you to update selected nodes with a specified firmware file. This page lists all nodes on the XBee network, along with their current firmware update status.

The gateway firmware update log is **digi.log**.

- **Show all | Coordinators | Routers | End devices** filter buttons: Use these buttons to filter the list of XBee nodes.
- **Click to update** buttons: Updates the selected XBee node with the selected firmware. Click the **UPDATE** button to start the update process.
- **XBee Node**: The Extended Address for the XBee node.
- **Current Firmware**: The current firmware file level loaded on the XBee node.
- **Target firmware**: The firmware to be loaded on the XBee node.
- **Role**: The role of the XBee node in an XBee/ZigBee network.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- **Status**: The firmware update status of the node. The possible values are as follows:
  - **Unknown**: The current firmware version has not yet been read from the node, or cannot be read from the node.
  - **Up to date**: The node is running the latest firmware version available on the gateway.
  - **Available**: A newer version of firmware is available on the gateway. Select the node and click **Update** to schedule an update. Schedule an update using the XBee **fw_update** command or the **Configuration** > **XBee Network** > **OTA Firmware Update Status** page on the web interface.
  - **Scheduled**: A firmware update is scheduled to be performed on this node.
  - **Updating**: A firmware update is currently running on this node.
  - **Updated**: A successful firmware update has been performed on this node.
  - **Complete**: The node has rejoined the network after a successful firmware update.
  - **Canceled**: A firmware update for this node was canceled by the user. Select the node and click **Update** to restart the update.
  - **Error**: A firmware update on this node has failed. Select the node and click **Update** to retry the update. Schedule an update using the XBee **fw_update** command or the **Configuration** > **XBee Network** > **OTA Firmware Update Status** page on the web interface.

XBee Gateway network Python log file

When you connect XBee node devices with your XBee Gateway using the XBee Gateway Python application, device data for your XBee network is captured in the form of events in one of the log files, **python.log**, for XBee Gateway.

You can access the **python.log** file through the web interface of your XBee Gateway or from Remote Manager.

For more information, see View your device data.

XBee network troubleshooting resources

For help troubleshooting issues with your XBee network, see the following resources:

- See the *XBee ZigBee Cloud Kit Getting Started Guide* for general information about the XBee network.
- See the Join your XBee node to your XBee Gateway section in the *XBee ZigBee Cloud Kit Getting Started Guide* for specific information about joining an XBee node to the XBee Gateway.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 144 / 177

Learn more about XBee Gateway

This section walks you through the steps required to connect your XBee Gateway with XBee hardware other than that in the XBee ZigBee Cloud Kit. The steps show you how to configure XBee Gateway and XBee nodes, explore the use of data I/O in your network solution, and view data from nodes.

Default startup and operation behaviors for XBee Gateway

XBee Gateway has several default startup and operation behaviors that compare against your own network's setup and operation. If these behaviors present any conflicts with your network's configuration and operation, you may need to adjust the settings in either XBee Gateway or you network.

Consider the following questions when deploying XBee Gateway in all types of networks:

- How many devices are you deploying, and for what purposes?
- Are you deploying one, several, or many devices over an Ethernet, Wi-Fi, or cellular network?

Default behavior regarding NTP time server access

By default, XBee Gateway accesses an NTP time server to establish its date and time. Access to an NTP server is required, and there is a default server.

The first time an XBee Gateway powers on and goes through its startup sequence, it needs to access the NTP time server to set its time, and then attempt to connect to Remote Manager. This first-time connection step could take up to five minutes or longer on Wi-Fi and cellular networks.

For XBee Gateway Ethernet and Wi-Fi models, you can specify up to **four** NTP servers to be used as upstream servers in synchronizing time. The default settings for the four NTP server settings are as follows:

NTP server 1: 0.time.devicecloud.com

NTP server 2: 0.time.devicecloud.com

NTP server 3: 0.idigi.pool.ntp.org

NTP server 4: 1.idigi.pool.ntp.org

XBee Gateway cellular models use the top NTP Server entry (**NTP Server 1**), and leave the others blank. XBee Gateway checks all NTP servers that are configured for time-drift. Having four NTP time servers configured for an XBee Gateway cellular device would result in excessive and unnecessary cellular usage.

Default behavior regarding DNS

A DNS (Domain Name System) server is an Internet service that resolves domain names into IP addresses. Name resolution is important when connecting to Remote Manager, as the servers are

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
㈜테솔 · www.tessol.com TS-TL-DGI-049 145 / 177
KOLAS 국제공인교정기관 · ISO/IEC 17025

provided as fully-qualified domain names.

XBee Gateway is capable of using up to three DNS servers. Up to two of these slots may be filled with DNS servers from dynamic IP assignment sources, leaving at least one slot always available for static DNS server configuration. A reasonable default is supplied for one static DNS server, but this default may not be appropriate for all customer networks.

Firewalls and required open ports

When you use a firewall to filter outbound traffic, XBee Gateway requires these network ports to be open for proper operation:

- UDP port **53**, for DNS
- UDP port **123**, for NTP
- TCP port **3199**, for Remote Manager

Deploying devices over a network

If deploying one to many XBee Gateway devices over a network, consider the network's topology and behavior: Does the network's setup and any configuration in place present any barriers to connectivity given the default behaviors listed above? Considerations for each supported network type are in the following configuration settings topics. If you have a network that does not match the default behaviors for supported network types stated below, you need to adjust settings as described in Configure XBee Gateway.

Connect the XBee nodes to XBee Gateway

This section explains how to configure the parameters for forming XBee networks on both XBee Gateway and XBee nodes. To connect XBee nodes to XBee Gateway:

1. Before you begin, download XCTU from www.digi.com/xctu. XCTU allows you to configure XBee RF modules.
2. Configure XBee Gateway as a coordinator.
3. Join nodes to the coordinator.
4. Verify that XBee nodes are joined to the coordinator.

If you are unfamiliar with XBee networks, see *XBee/XBee-PRO ZigBee RF Modules User Guide* for information about the key concepts.

Configure XBee Gateway as a coordinator

The first device to configure with a custom PAN ID is the coordinator, which in this case is XBee Gateway. To change the PAN ID of your XBee Gateway:

1. From a web browser, open the **Home** page of your XBee Gateway ZigBee and go to the XBee Network section from the left menu.
2. Select the local XBee device for XBee Gateway. The **XBee Configuration** page appears.
3. From the **XBee Configuration** page, open the **Network Settings** section.
4. Type your custom PAN ID value in the **Extended PAN ID (ID)** field. Remember this value, as you will configure the other ZigBee nodes on the network with the same one.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

5. If XBee Gateway uses XBee security parameters, set the XBee security parameters (**EE**, **EO**, **NK**, **KY**) as needed. The security parameters are as follows:
   - **EE**: Enable or disable security in the network.
   - **EO**: Set the security policy for the network.
   - **NK**: Set the network security key for the network. If set to 0 (default), the device will use a random network security key.
   - **KY**: Set the trust center link key for the network. If set to 0 (default), the device will use a random network security key.

   For more information on these parameters, see the *XBee/XBee-PRO® S2C Zigbee® RF Modules User Guide*.
6. Click **Apply** to save the changes in the device. After applying the changes, the coordinator initializes the ZigBee network with the new PAN ID.

Join nodes to the coordinator

Use XCTU to set PAN ID and encryption settings to match those on the coordinator (XBee Gateway).

Next, configure your ZigBee nodes to connect to XBee Gateway. To do this, you will set the PAN ID for the ZigBee nodes to match the PAN ID you just set in XBee Gateway. Because the ZigBee are not yet joined to the network that your XBee Gateway (coordinator) initialized, you cannot configure them using the XBee Gateway web interface. Instead, you must use the XCTU software.

You must install XCTU on your computer. If you do not have XCTU installed, go to www.digi.com/xctu to download and install XCTU.

Once you have XCTU installed, follow these steps to change the PAN ID of an XBee ZigBee module:

1. Attach the XBee ZigBee node to an XBee development board, and connect it to your computer using a USB cable.
2. Open XCTU and add the XBee node that is connected to your computer to the list of radio modules.
3. Select the node and wait for the application to read all its settings.
4. Under the **Networking** category, replace the current PAN ID with your custom PAN ID in the **ID PAN ID** field.
5. Once you have changed the setting, click the **Write radio settings** button to save the new PAN ID in the XBee module.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

6. If XBee Gateway uses XBee security parameters, set the XBee security parameters (**EE**, **EO**, **NK**, **KY**) as needed. The security parameters are as follows:
   - **EE**: Enable or disable security in the network.
   - **EO**: Set the security policy for the network.
   - **NK**: Set the network security key for the network. If set to 0 (default), the device will use a random network security key.
   - **KY**: Set the trust center link key for the network. If set to 0 (default), the device will use a random network security key.

   For more information on these parameters, see the *XBee/XBee-PRO® S2C Zigbee® RF Modules User Guide*.
7. Click the **Write radio settings** button to save the new security settings in the XBee module. As soon as you save the new PAN ID in the XBee RF module, the module tries to connect to the ZigBee network that has the PAN ID that you configured.

Verify that XBee nodes are joined to the coordinator

To verify that your XBee ZigBee module has successfully joined the ZigBee network:

1. Make sure XBee Gateway is powered on. Make sure the XBee ZigBee node is mounted on the development board and that the development board is powered on.
2. From a web browser, open the **Home** page of your XBee Gateway.
3. Under **Configuration**, click **XBee Network**. The XBee Configuration page appears.
4. Below the Remote XBee Devices table, select the **Clear list before discovery** check box and click the **Discover XBee Devices** button.
5. After some seconds the **Remote XBee Devices** table displays your XBee ZigBee node.

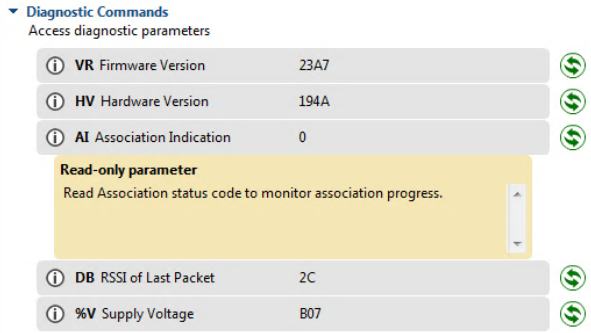
원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

6. If the XBee node does not appear in the **Remote XBee Devices** table, use XCTU to view the **AI** (**Association Indicator**) for the node.

   The Association Indicator is located under the Diagnostic Commands settings for the node. The **Association Indicator** shows the node's current association status, which points to the reason the node is not connecting to the coordinator. There are several possible values for the **Association Indicator**, all described in the *XBee/XBee-PRO ZigBee RF Modules User Guide* (Digi part number 90000976). This document is available from the XBee/XBee-PRO S2C ZigBee Modules page. A value of 0 means the node has successfully joined or started a network.

   The following image shows an example of an **Association indicator** for a node:



Configure the ZigBee network addressing parameters for XBee nodes

This section describes how to configure the ZigBee network addressing parameters for your XBee nodes.

If you are unfamiliar with XBee networks, see *XBee/XBee-PRO ZigBee RF Modules User Guide* for information about the key concepts.

Key addressing parameters

XBee RF modules have many parameters. In many cases, the default setting for a parameter is sufficient. For successful transmission of data from XBee nodes and use with the XBee Gateway Python application, there are several key addressing parameters that must be set on XBee nodes:

- **Destination Address** (**DH**/**DL**): These parameters set the high and low portions of the destination address for data.
- **ZigBee Destination Endpoint** (**DE**): This parameter sets the ZigBee Destination Endpoint. The Python application running on XBee Gateway that interacts with XBee nodes assumes a Destination Endpoint of **0xe8**.
- **ZigBee Cluster ID** (**CI**): Sets the ZigBee Cluster ID. The Python application running on XBee Gateway that interacts with XBee nodes assumes a ZigBee Cluster ID of **0x11**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Configure the network addressing parameters

To configure the network addressing parameters:

1. Access the XBee Gateway web interface.
2. Click **XBee Configuration** > **Remote XBee Devices** list.
3. Click a node under **Remote XBee Devices**. The XBee Configuration settings for the node appear.
4. Click **Addressing Settings**.
5. In the **Destination Address (DH/DL)** field, set the destination address for the data to be sent from the node.
6. Under **ZigBee Addressing**, set the **ZigBee Destination Endpoint (DE)** to **0xe8** and set the **ZigBee Cluster ID (CI)** parameter to **0x11.**
7. Click **Apply** to save your changes.

Explore serial I/O

If you want your XBee nodes to send data over a serial line, you must configure the XBee nodes for your ZigBee network to transmit serial data.

If you are unfamiliar with I/O configuration, the following resources will help you understand key concepts:

- *Building Wireless Sensor Networks*
- *XBee/XBee-PRO ZB RF Modules User Guide*
- About programming provides several examples of I/O configuration

Understand the process for configuring the serial I/O

The process for configuring the serial I/O requires that you:

1. Assess the device hardware connected to the XBee nodes. What kind of equipment is it? What type of information is it measuring, collecting, and transmitting?

   This assessment will help you identify the I/O connections and pins needed, and later to set serial I/O parameters appropriate for the attached hardware.
2. Understand what must be configured for the XBee module on the XBee nodes and attached hardware to work with the XBee Gateway Python application.

   XBee RF modules have many parameters. In many cases, the default setting for a parameter is sufficient. For successful serial transmission of data from XBee nodes and use with the XBee Gateway Python application, the **Serial settings** for the XBee node must match the serial settings for the device attached to the XBee serial port that you are configuring.
3. Configure XBee serial parameters.

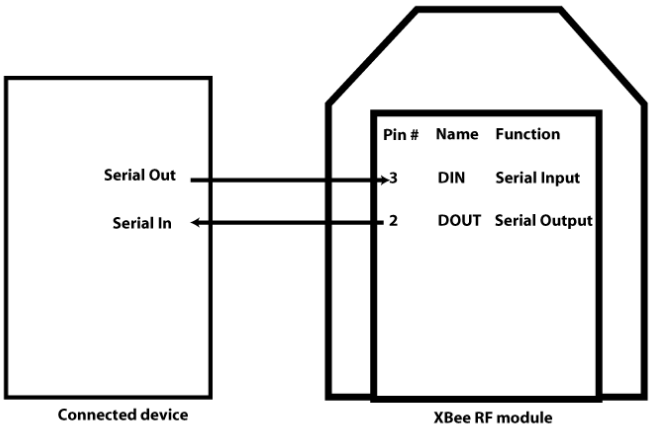
원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Example serial I/O configuration

The following example demonstrates the serial I/O configuration process, between an XBee RF module and connected device.

- Serial data input uses **pin 3** (**DIN**).
- serial data output uses **pin 2** (**DOUT**).
- For this example, we assume that the hardware uses the default serial settings: 9600 bps, 8 data bits, no parity, 1 stop bit.



Configure the serial I/O

To configure the serial I/O:

1. Access the XBee Gateway web interface.
2. Click **XBee Configuration** > **Remote XBee Devices**.
3. Click a node under **Remote XBee Devices**. The XBee Configuration settings for the node appear.
4. Click **Serial Settings**. These settings configure the serial connection between the XBee node and attached hardware, that is, XBee pin 2 (DOUT) and pin 3 (DIN).

   Note that the **CTS Flow Control (D7)** and **RTS Flow Control (D6)** and any changes to them are also displayed on the I/O Pin Settings page under **DIO6** and **DIO7**.
5. Make sure the serial settings displayed match those the hardware attached to the XBee node through the serial port.
6. If changes are required, click **Apply** to save your changes. Note that the examples shown in this task use the default serial settings. If the default serial settings match the hardware connected to the XBee node, you can leave the page as-is.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 151 / 177

Explore digital and analog I/O

If you want your XBee nodes to transmit digital or analog data, you must configure the XBee nodes for your ZigBee network to transmit digital or analog I/O.

If you are unfamiliar with I/O configuration, the following resources will help you understand key concepts:

- Digi knowledge base article: Digital and analog sampling using XBee radios
- *Building Wireless Sensor Networks* by Rob Faludi
- *XBee/XBee-PRO ZB RF Modules User Guide*
- About programming provides several examples of I/O configuration

Understand the process for digital and analog I/O

The process for configuring digital or analog I/O requires that you:

1. Assess the device hardware connected to the XBee nodes. What kind of equipment is it? What type of information is it measuring, collecting, and transmitting?

   This assessment will help you identify the I/O connections and pins needed, and later to set serial I/O parameters appropriate for the attached hardware.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

2. Understand what must be configured for the XBee module on the XBee nodes and attached hardware to work with the XBee Gateway Python application.

   The XBee Gateway Python application resides on XBee Gateway. It allows you to connect your XBee modules to Remote Manager, enabling them to upload data to Remote Manager and receive remote text and commands. The XBee Gateway Python application is already installed in your XBee Gateway device and automatically starts when the gateway is initialized.

   XBee RF modules have many parameters. In many cases, the default setting for a parameter is sufficient. For successful transmission of data from XBee nodes and use with the XBee Gateway Python application, there are several key parameters that must be set on XBee nodes:

   - **Destination Address** (**DH**/**DL**): These parameters set the high and low portions of the destination address for data.
   - **ZigBee Destination Endpoint** (**DE**): This parameter sets the ZigBee Destination Endpoint. The Python application running on XBee Gateway that interacts with XBee nodes assumes a Destination Endpoint of 0xe8.
   - **ZigBee Cluster ID** (**CI**): Sets the ZigBee Cluster ID. The Python application running on XBee Gateway that interacts with XBee nodes assumes a ZigBee Cluster ID of 0x11.
   - **Serial settings**: These settings must match those for the device attached to the XBee serial port that you are configuring.
   - **Input/Output settings**: These settings configure the input and output functions for pins on the XBee RF module. These settings are known as I/O pin settings. XBee RF module pins have fixed or reserved settings for many pins, and several user-configurable pins.

     There are additional I/O parameters that you can set for I/O, including the sampling methods and sampling rates for digital and analog input.
3. Configure XBee addressing parameters on the XBee nodes.
4. If you are using a serial connection between the XBee nodes and their attached hardware, configure XBee serial parameters.
5. Configure I/O settings for the pins of each node's XBee RF module. This step includes several substeps:

   a. Configure digital I/O.

   b. Configure analog I/O.

   c. Configure Parameters that set the I/O sampling rate. There are different parameters for digital and analog I/O.

Example digital or analog I/O configuration

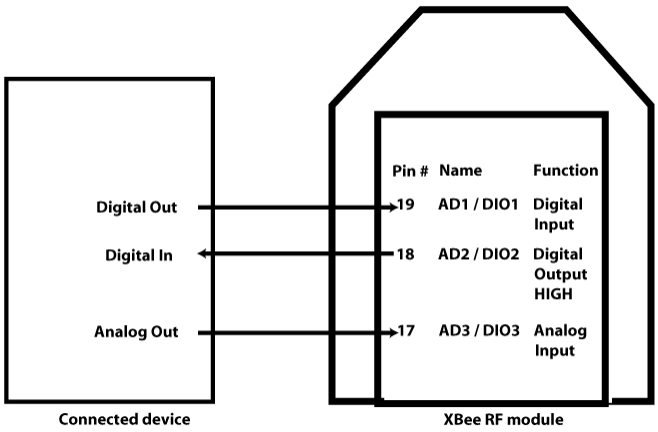
The following example demonstrates the digital or analog I/O configuration process, between an XBee RF module and connected device.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 153 / 177

- Digital I/O: The following pins are used for digital I/O:
  - Digital data input from the connected device uses **Pin 19** (**AD1** / **DIO1**). This digital input uses the pullup resistor and change detection sampling.
  - Digital data output to the connected device. uses **Pin 18 (AD2** / **DIO2**).
- Analog I/O: 1 analog input from the connected device is on **pin 17** (**AD3** / **DIO3**), with a sampling rate of every **30 seconds**.



Configure the digital or analog I/O

To configure the digital or analog I/O:

1. Access the XBee Gateway web interface.
2. Click **XBee Configuration** > **Remote XBee Devices**.
3. Click a node under **Remote XBee Devices**. The **XBee Configuration settings** page for the node appears.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

4. Click **Input/Output Settings**. The I/O Settings table displays the DIO settings for the pins on the XBee node.

   The fields in the I/O Settings table are as follows:
   - **DIO**: Digital input/output.
   - **AT**: The AT command associated with the DIO line.
   - **Functions**: Additional functions associated with this DIO beyond digital I/O.
   - **Setting**: The input or output function to be assigned to this DIO. The numbers in parentheses (2, 4, 5, etc) represent the value for each setting on the AT command associated with the setting.
     - **Disabled**: I/O for this DIO is disabled.
     - **Analog Input**: Sets the DIO to analog input.
     - **Digital Input**: Sets the DIO to digital input.
     - **Digital Output, Low**: Sets the DIO to digital output and outputs a low signal.
     - **Digital Output, High**: Sets the DIO to digital output and outputs a high signal.
   - The **Pull up** and **Detect** check boxes are used when a DIO line is set to Digital Input. These settings are used to determine how sampling of digital input is handled.
     - **Pull up**: Enables the pull-up resistor. Sets or clears the appropriate bit of the PR parameter, described below.
     - **Detect**: Sets or clears the appropriate bit of the IC parameter, described below.
5. Set **DIO1** to **Digital Input**. Check both the **Pullup** and **Detect** check boxes. More information on these options is in step 5.
6. Set **DIO3** to Set DIO3 to **Analog Input**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

7. Configure the settings for sampling. There are several parameters for sampling methods and rates:

   Pull up Resistor Enable (PR) / **Pull up** check box for each DIO:

   DIO Change Detect (IC) / **Detect** check box for each DIO: For digital input, the **DIO Change Detect (IC)** parameter configures the pin for digital sampling. You can configure modules to transmit a data sample immediately whenever a monitored digital IO pin changes state. The IC command is a bitmask that you can use to set which digital IO lines should be monitored for a state change. If one or more bits in IC is set, an IO sample will be transmitted as soon as a state change is observed in one of the monitored digital IO lines. Change detection samples are transmitted to the 64-bit address specified by the **Destination Address (DH/DL)** parameters.

   Set this parameter to **0x2** to use. Each time the value of the specified DIO changes, the XBee module sends an XBee packet with the new value of the DIO to XBee Gateway. Another way to enable the IC parameter is to enable the **Detect** check box for a DIO set to digital input.

   I/O Sampling Rate (IR): For analog input, the **I/O Sampling Rate (IR)** parameter sets the sampling rate, in milliseconds.

   Periodic sampling allows an XBee/XBee-PRO module to take an IO sample and transmit it to a remote device at a periodic rate. If **IR** is set to 0, periodic sampling is disabled. For all other values of **IR**, data will be sampled after the number of milliseconds set by the **IR** parameter have elapsed and then transmitted to a remote device. The **Destination Address** (**DH**/**DL**) parameters determine the destination address of the IO samples. You can set **DH** and **DL** set to 0 to transmit to the coordinator, or to the 64-bit address of the remote device (**SH** and **SL** parameters). Only devices running API firmware can send IO data samples out their UART. Devices running AT firmware will discard received IO data samples. A sleeping end device will transmit periodic IO samples at the **IR** rate until the **ST** timer expires and the device can resume sleeping.

   The sampling setting for analog input must be configured. We want to sample the analog input every 30 minutes, or 30000 milliseconds. Under I/O settings, in the **I/O Sampling Rate (IR)** setting, type **30000**.

8. Click **Apply** to save your changes.

View your device data

After you configure the I/O for your XBee nodes, you can view the data from the nodes. The device data is available for viewing from the following locations:

- View device data from Remote Manager
- View device data and events in the Python log file for XBee Gateway

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

View device data from Remote Manager

The nodes in your XBee network report data back to the gateway. This information appears on the **Data Services** tab in Remote Manager.

1. From Remote Manager, go to **Data Services** > **Data Files** > **Data Streams**. If you completed the steps in Set up XBee Gateway summary, several data streams are available. The data streams of your XBee ZigBee will be similar to:

```
00000000-00000000-00409DFF-FF123456/xbee.digitalIn/
[00:13:A2:00:11:22:33:44]!/DIO4
```

2. Type the device ID for your XBee Gateway in the data stream search box in the upper-right side of the data stream view to locate the data streams for your XBee Gateway. For example:

```
00000000-00000000-00409DFF-FF123456
```

View device data and events in the Python log file for XBee Gateway

The XBee Gateway Python application resides on XBee Gateway. Its key functions include connecting your XBee modules to Remote Manager, enabling uploads of data to Remote Manager, and receiving remote text and commands. The XBee Gateway Python application is installed in your XBee Gateway device and automatically starts when the gateway initializes. When you use the XBee Gateway Python application, device data for your XBee network is captured in the form of events in one of the XBee Gateway log files, **python.log**. Events that may be of note include:

- Serial or I/O data arriving from an XBee node on your RF network
- An RCI command received from Remote Manager
- Attempts to upload data to Data Streams in Remote Manager
- Errors and warnings during execution for debugging and diagnostics

The **python.log** file may be accessed through the XBee Gateway web interface or from Remote Manager.

See XBee Gateway Python application and Remote Manager for more information.

View the Python log file

To view the log file, choose one of the following options:

- From Remote Manager, the system log is a file maintained in the file system of the device. To retrieve it, use the File Management capabilities in Remote Manager. See the *Digi Remote Manager User Guide* if you need help.
- From the XBee Gateway web interface:
  1. Access the XBee Gateway web interface.
  2. Click **Administration** > **System Log**.
  3. Select **python.log** from the **Select Log File** menu and click the **Get File** button.
  4. Click the **Refresh** button to ensure the data is up to date.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

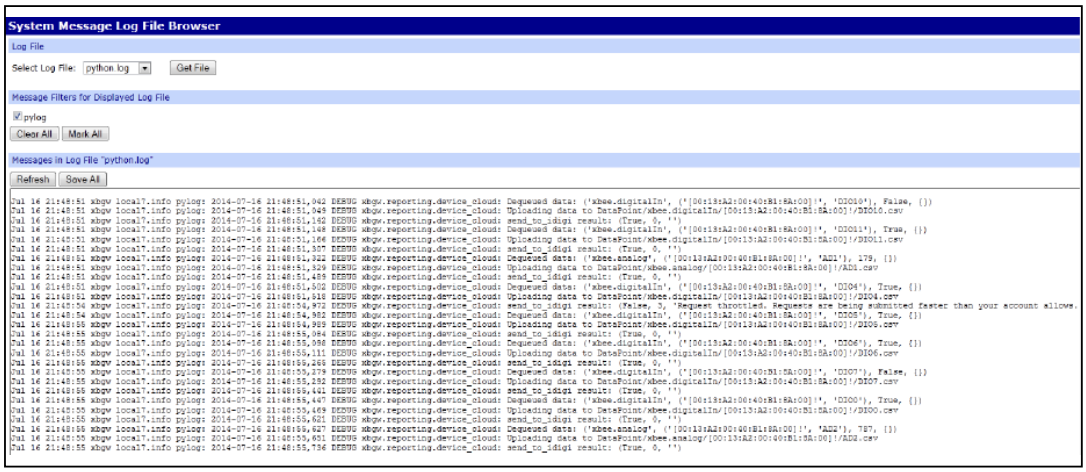
TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 157 / 177

Learn more about XBee Gateway *View your device data*

System message Python log file example

The following example shows a python.log file for an XBee Gateway with an XBee node configured for digital and analog I/O:



In this log file excerpt:

- These lines show that the XBee Gateway Python application has started up successfully:

```
Aug  4 19:44:06 (none) local7.info pylog: 2014-08-04 19:44:06,804 INFO
root: XBGW App Version: 1.1.0b2
Aug  4 19:44:06 (none) local7.info pylog: 2014-08-04 19:44:06,860 INFO
xbgw.xbee.manager: Initializing XBeeEventManager
Aug  4 19:44:06 (none) local7.info pylog: 2014-08-04 19:44:06,934 INFO
xbgw.xbee.ddo_manager: Initializing DDOEventManager
Aug  4 19:44:07 (none) local7.info pylog: 2014-08-04 19:44:07,030 INFO
xbgw.reporting.device_cloud: Initializing DeviceCloudReporter
Aug  4 19:44:07 (none) local7.info pylog: 2014-08-04 19:44:07,072 INFO
xbgw.command.rci: RCICommandProcessor initialized
```

- These lines show that the XBee Gateway Python application received a digital I/O reading:

```
Aug  4 19:47:38 (none) local7.info pylog: 2014-08-04 19:47:38,524 DEBUG
xbgw.xbee.manager: Received frame from ('[00:13:A2:00:40:9F:6F:CB]!', 0xe8,
0xc105, 0x92, 0x1, 0x0)
Aug  4 19:47:38 (none) local7.info pylog: 2014-08-04 19:47:38,542 DEBUG
xbgw.xbee.manager: Processing IO sample from pin DIO12
Aug  4 19:47:38 (none) local7.info pylog: 2014-08-04 19:47:38,554 DEBUG
xbgw.xbee.manager: Digital reading: 0
```


원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Learn more about XBee Gateway *View your device data*

- These lines show that the XBee Gateway Python application received an analog I/O reading:

```
Aug  4 19:47:38 (none) local7.info pylog: 2014-08-04 19:47:38,610 DEBUG
xbgw.xbee.manager: Processing IO sample from pin AD3
Aug  4 19:47:38 (none) local7.info pylog: 2014-08-04 19:47:38,620 DEBUG
xbgw.xbee.manager: Analog data: 780
```


원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

- These lines show that data points, in this case, six data points, were uploaded to Remote Manager:

```
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,207 INFO
xbgw.reporting.device_cloud: Uploading data to DataPoint/upload.csv
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,220 DEBUG
xbgw.reporting.device_cloud: stream_id: xbee.analog/
[00:13:A2:00:40:9F:6F:CB]!/AD1
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,230 DEBUG
xbgw.reporting.device_cloud: data: ('xbee.analog/
[00:13:A2:00:40:9F:6F:CB]!/AD1', 426, {})
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,238 DEBUG
xbgw.reporting.device_cloud: stream_id: xbee.digitalIn/
[00:13:A2:00:40:9F:6F:CB]!/DIO4
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,245 DEBUG
xbgw.reporting.device_cloud: data: ('xbee.digitalIn/
[00:13:A2:00:40:9F:6F:CB]!/DIO4', True, {})
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,263 DEBUG
xbgw.reporting.device_cloud: stream_id: xbee.digitalIn/
[00:13:A2:00:40:9F:6F:CB]!/DIO6
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,280 DEBUG
xbgw.reporting.device_cloud: data: ('xbee.digitalIn/
[00:13:A2:00:40:9F:6F:CB]!/DIO6', True, {})
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,288 DEBUG
xbgw.reporting.device_cloud: stream_id: xbee.digitalIn/
[00:13:A2:00:40:9F:6F:CB]!/DIO7
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,300 DEBUG
xbgw.reporting.device_cloud: data: ('xbee.digitalIn/
[00:13:A2:00:40:9F:6F:CB]!/DIO7', False, {})
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,308 DEBUG
xbgw.reporting.device_cloud: stream_id: xbee.digitalIn/
[00:13:A2:00:40:9F:6F:CB]!/DIO0
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,324 DEBUG
xbgw.reporting.device_cloud: data: ('xbee.digitalIn/
[00:13:A2:00:40:9F:6F:CB]!/DIO0', True, {})
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,332 DEBUG
xbgw.reporting.device_cloud: stream_id: xbee.analog/
[00:13:A2:00:40:9F:6F:CB]!/AD2
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,337 DEBUG
xbgw.reporting.device_cloud: data: ('xbee.analog/
[00:13:A2:00:40:9F:6F:CB]!/AD2', 780, {})
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,354 INFO
```


원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Learn more about XBee Gateway *View your device data*

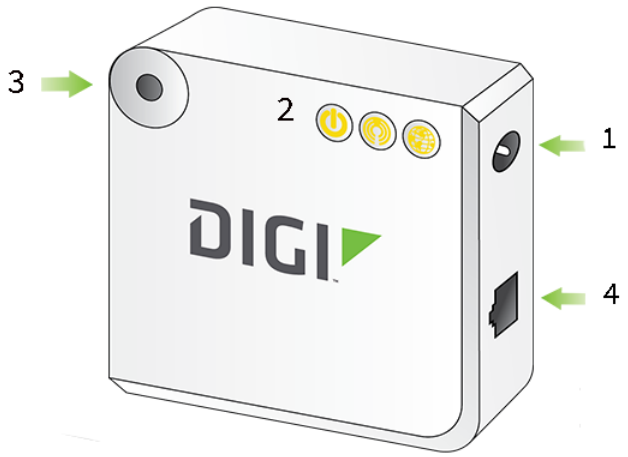
```
xbgw.reporting.device_cloud: Upload contains 6 datapoints
Aug  4 19:47:44 (none) local7.info pylog: 2014-08-04 19:47:44,526 INFO
xbgw.reporting.device_cloud: Upload successful
```


원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Hardware

This section provides hardware information for XBee Gateway.
For hardware specifications, refer to the XBee Gateway data sheet.

Ethernet and Wi-Fi hardware



Item	Description	More information
1	Power supply	Connect the power supply to the gateway. See Connect the Wi-Fi hardware.
2	LED status indicators	See XBee Gateway LEDs descriptions.
3	Button	See XBee Gateway button.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Item	Description	More information
4	Ethernet features	If you are using an Ethernet connection in addition to the cellular, connect one end of an Ethernet cable to your gateway and the other to a live Ethernet jack. See Connect the Wi-Fi hardware.
	Antennas (internal)	Internal feature. See Antennas.

Cellular hardware

Item	Description	More information
1	Power supply	Connect the power supply to the gateway. See Connect the cellular hardware.
2	LED status indicators	See XBee Gateway LEDs descriptions.
3	Button	See XBee Gateway button.
4	Ethernet cable	If you are using an Ethernet connection in addition to the cellular, connect one end of the Ethernet cable to your gateway and the other to a live Ethernet jack. See Connect the cellular hardware.
5	Antennas (internal)	See Antennas.
6	SIM card installation	See Set up and configure GSM-based devices.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Antennas

XBee Gateway has internal antennas.

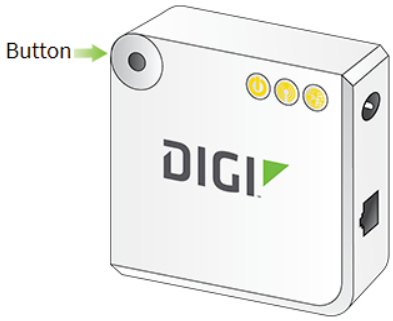
- All models have an internal antenna for the XBee RF module.
- Wi-Fi models have an additional internal antenna.
- Cellular models have an additional internal cellular antenna. If the **Signal Strength** LED is low or off for these models, try moving the Digi device to another location to improve signal strength. Avoid placement of the gateway on or near a metal surface, as this may "detune" the cellular antenna and cause poor reception. If a nearby metal surface is unavoidable, ensure at least a 2.54 cm (1 in) air gap exists between the metal surface and gateway. For example, a non-metallic spacer (such as a piece of foam) could be placed between the gateway and metal surface, and should help to improve the cellular signal. A gap of 10.16 cm (4 in) is preferred, and has been found to eliminate 90% of potential detuning.

  Proper placement can drastically increase the signal strength of a cellular connection. Moving a cellular gateway closer to an exterior window (or other location within the facility) often results in optimum reception. Another way of increasing cellular throughput is by physically placing the Digi device on the roof of the building, in an environmentally safe enclosure with proper moisture and lightning protection.

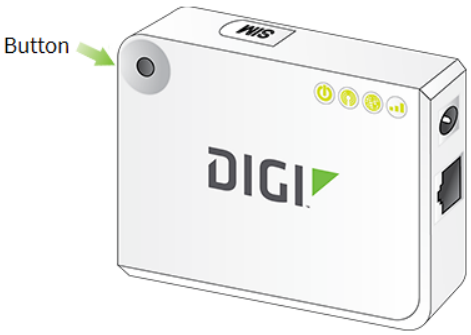
XBee Gateway button

You can configure the button on XBee Gateway to perform a number of actions. You can configure the button in Remote Manager.

- Restore XBee Gateway factory defaults
- Use discovery tools to enable configuration changes
- Use the button to enable the web interface
- Use the button to enable special-purpose Wi-Fi configuration mode



XBee Gateway Ethernet and Wi-Fi models



XBee Gateway Cellular model

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

A Python application can read a button state. You can do this in conjunction with the Digi standard actions, you can enable and disable the button behaviors individually, or you can disable all Digi behaviors to provide full responsibility for the button to an application. See Button handling for program sample details.

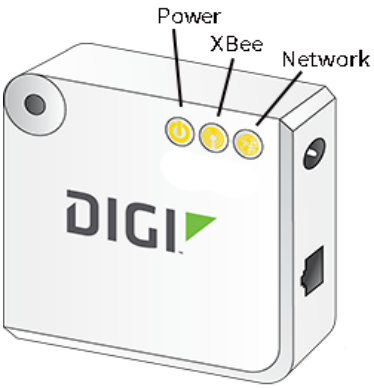
XBee Gateway LEDs descriptions

XBee Gateway has several LEDs. See the sections below for a description of the LEDs and their default behavior.

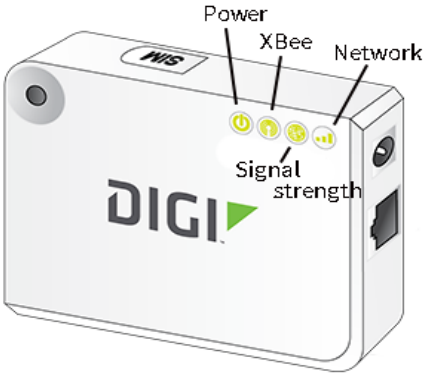
- Power LED
- XBee LED
- Network LED
- Signal strength LED (cellular models only)

You can control some of the LEDs programmatically. See LED control for a description of how to control the LEDs on XBee Gateway.

See Troubleshooting LEDs for troubleshooting information.



LEDs for Wi-Fi and Ethernet models



LEDs for the cellular model

Power LED

LED	Color and blink pattern	Description
	OFF (dark)	No power.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

LED	Color and blink pattern	Description
	Solid green	Device is powered. This state does not indicate that the device is fully operational. The Network LED and its states convey such information.

XBee LED

The XBee LED indicates the network connection status of the XBee RF module in XBee Gateway to a ZigBee wireless network. At startup, if you are not yet deploying your device in a ZigBee network, you can ignore this LED and its states. Once XBee Gateway is deployed in a ZigBee network, the XBee LED behavior varies depending on whether XBee Gateway acts as a coordinator or a router. For information on changing XBee Gateway from a coordinator to a router, see the topic Join XBee Gateway to an existing ZigBee network.

Note The XBee LED remains dark during the initial boot of the device. All diagnosis related to this LED must be done after the device has been running for at least 60 seconds.

LED	Color and blink pattern	Description
	Solid green	The XBee RF module has not started or joined a network.
	Blinking green	The XBee RF module has started or joined a network.

Network LED

Note The Network LED remains dark during the initial boot of the device. All diagnosis related to this LED must be done after the device has been running for at least 60 seconds.

LED	Color and blink pattern	Description
	OFF	XBee Gateway operating system is not yet running.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

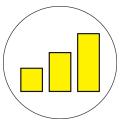
LED	Color and blink pattern	Description
	Blinking yellow, slow	Operating system is running, but no network link is established or IP address assigned.
	Solid yellow	An IP address has been assigned to XBee Gateway.
	Blinking yellow - fast (1 blink per second)	A network issue has occurred. The two most common Remote Manager connectivity-related reasons for this state are: 1. XBee Gateway cannot connect to a DNS server to resolve the Remote Manager server address. See Cannot connect to DNS server to resolve the Remote Manager server address for troubleshooting information. 2. XBee Gateway cannot connect to an NTP time server to get the correct time. See Cannot connect to NTP time server to get correct time for troubleshooting information.
	Solid yellow to blinking green	XBee Gateway is attempting a connection to a Remote Manager server.
	Blinking green - fast (1 blink per second)	Remote Manager server found and XBee Gateway is undergoing authentication.
	Solid green	XBee Gateway is connected to the Remote Manager server.

Signal strength LED (cellular models only)

LED	Color and blink pattern	Description
	OFF (dark)	No or poor cellular signal. Moving device to a better location is recommended.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

LED	Color and blink pattern	Description
	Solid yellow	Adequate cellular signal. This signal strength works for most applications.
	Solid green	Good cellular signal.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Troubleshoot your XBee Gateway

This section covers common issues and troubleshooting information for your XBee Gateway.

XBee Gateway system log

The **System Message Log File Browser** is a diagnostic tool that allows you to view entries in a system log file. The default log that appears in the System Message Log File Browser is **eventlog.txt**. This file is the primary message log for informational notices.

Logging is always enabled and is not user-configurable. When the Digi device operates in an unexpected manner, you can send the log entries to Digi for analysis by Technical Support and Engineers. The event log cannot be turned off, so that Digi receives an accurate view of all aspects of the operation of the device.

For information about how to access the **System Message Log File Browser**, see Display the system log.

XBee Gateway log files and contents

By default, logging on XBee Gateway is always enabled and is not user-configurable. When a Digi device operates in an unexpected manner, you can send the log entries to Digi for analysis by Technical Support and Engineers. The event log cannot be turned off, so that Digi receives an accurate view of all aspects of the operation of the device.

The **Message Filters for Displayed Log File** section on the **System Message Log File Browser** page in the web interface displays available message filters for each log file type. These message filters allow Digi Technical Support to quickly find areas of interest in the log file when working with customers on troubleshooting issues.

Use the available XBee Gateway system log files to debugging specific parts of the system. These log files have a fixed size and roll over when they reach their maximum size. When the file rolls over, a single secondary file is created with the extension **.0**. For example, when **eventlog.txt** rolls over, the older data will be stored in **eventlog.txt.0**. When both files reach their maximum size, the older file will be overwritten. Also note that many of the log files are stored in persistent memory (flash) and will contain data from multiple boots. The only exception is xbee.log, which is stored in a RAM disk.

Log File	Contents
eventlog.txt eventlog.txt.0	High-level system messages. For more information, see XBee Gateway system log.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

Log File	Contents
python.log python.log.0	Captures any output of Python programs that were started with the Python auto-start feature. For more information, see XBee Gateway network Python log file.
xbee.log xbee.log.0	A non-persistent log file that records all XBee traffic.
digi.log digi.log.0	For internal use only. This file may be requested by the Digi technical support group. For more information, see OTA Firmware Update page.
sef.log sef.log.0	For internal use only.
messages.log messages.log.0	For internal use only.
cherokee.log cherokee.log.0	For internal use only. This log contains a line for each request handled by the Cherokee web server in XBee Gateway.

Display the system log

To display the system log, choose one of the following options:

From Remote Manager

Note There is no browser interface for system logs in the Remote Manager interface. The following instructions explain how to navigate from the Remote Manager interface to the **WEB/logging** directory on the XBee Gateway system to access the system logs.

1. Click **File Management** under **Administration**. The **File Management** page appears.
2. Click **/WEB** and go to the **WEB/logging** directory on the XBee Gateway system.
3. Select the log files (for example, **digi.log**, **xbee.log**, **python.log**, and so on) and then click the **Download** button to download the logs to your computer.

   Note that the downloaded files are read-only. For more information on log files, see XBee Gateway log files and contents.

From the XBee Gateway web interface

Note The **System Message Log File Browser** is a diagnostic tool that allows you to view entries in a system log file. The default log that appears in the System Message Log File Browser is **eventlog.txt**. This file is the primary message log for informational notices.

1. Access the XBee Gateway web interface
2. Click **Administration** > **System Log**. The **System Message Log File Browser** appears.
3. Type the name of the log file in the **Select Log File** field or select a log file from the **Select Log File** drop-down list and click **Get File**. The contents of the log file appear under **Messages in Log File**.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

4. To filter the contents of the log file under **Messages in Log File**, select the check box next message filter that you want to use under **Message Filters for Displayed Log File**.

Cellular connection issues

This information in this section covers common issues and troubleshooting information for your cellular connection.

Common provisioning issues

Some common causes for XBee Gateway failing to provision include:

Probable cause	Resolution
No or poor cellular signal	Check signal strength in the **Signal strength**, **Signal level**, and **Signal quality** fields. ■ In Remote Manager, click **System information** > **Mobile information**. ■ In the web interface, click **Administration** > **Mobile Status**. Move the device to a different location and recheck the signal quality. Placement can drastically increase the signal strength of a cellular connection. Often times, moving the gateway closer to an exterior window or to another location within the facility can result in optimum reception. Another way of increasing throughput is by physically placing the gateway on the roof of the building, in an environmentally safe enclosure with proper moisture and lightning protection. If you are unable to relocate the gateway, note that the optimum physical orientation is for the gateway to be standing on its edge, with the Ethernet port and power plug pointing towards the nearest cell tower.
SIM is not properly installed	Check the following pages of the web interface for the following fields and messages: ■ The **Configuration** > **Mobile Connectivity** page **SIM PIN status**, the **SIM IMSI**, and **SIM ICCID**. If these items are blank, the SIM is not properly installed. ■ On the **Administration** > **Mobile Status** page: **SIM not ready**. ■ On the **Administration** > **System Log** > **Event Log**, the message **Connection error**: **SIM not ready**. Ensure that a SIM is properly installed.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 171 / 177

Probable cause	Resolution
Unit does not have proper APN entered	If the proper APN is not entered, the device will not receive a Mobile IP Address. Access the mobile status page: ■ In Remote Manager, click **System information** > **Mobile information**. ■ In the web interface, click **Administration** > **Mobile Status**. Check the mobile status fields: ■ The **Mobile IP Address** will be blank. ■ The **SIM IMSI**, **SIM ICCID** and **SIM PIN status** fields will display values. ■ The **Signal strength** will be good. ■ **Connection error** will display **Not registered**. ■ **Carrier loss** will display **Disconnect reason**. ■ The **Connections**, **Connection errors** and **Carrier loss** will be incrementing. Ensure that the proper APN is entered by verifying the name entered under **Configuration** > **Mobile Connectivity** and possibly verifying with the provider. Also, the provider may require a user name and password.

Troubleshooting XBee Gateway GSM devices

If provisioning fails and your device fails to connect to the cellular network, log in to the XBee Gateway web interface, and click **Administration** > **Mobile Status**. From the **Mobile Status** page, you can examine the provisioning and connection status.

Key Mobile Status fields for troubleshooting GSM devices

Following are some key provisioning-related fields on the Mobile Status page. For a description of all status fields, see Mobile device status.

- SIM PIN status
- SIM slot index
- Signal strength
- Signal level
- Signal quality
- Registration status
- Mobile country code
- Mobile network code
- Connection state
- Connection error
- Disconnect reason
- IP address

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

- DNS primary address
- DNS secondary address

Troubleshooting XBee Gateway CDMA devices

If provisioning fails and your device fails to connect to the cellular network, log in to the XBee Gateway web interface, and click **Administration** > **Mobile Status**. From the **Mobile Status** page, you can examine the provisioning and connection status.

Key Mobile Status Fields for troubleshooting CDMA devices

Following are some key provisioning-related fields on the **Mobile Status** page. For a description of all status fields, see Mobile device status.

- Provisioning status
- Signal strength
- Signal level
- Signal quality
- Registration status
- Connection state
- Connection error
- Disconnect reason
- IP address
- DNS primary address
- DNS secondary address

Device Discovery troubleshooting tips

If your device does not appear in the list of devices after using the Digi Device Discovery utility, consider the following tips.

- **Firewalls**: Verify that any software firewalls (common examples are Windows Firewall and most popular Anti-Virus software) are disabled. These can block the discovery process. Also, any physical firewall will almost certainly block the discovery process as well.
- **Routers or switches**: Is there a router between the computer running the discovery utility and the Digi device itself? Normally, routers will block the discovery process. If possible remove them and use a hub instead. If there is a switch in between this may or may not be a problem. Occasionally they are configured to block the discovery traffic. If you are unsure use a hub or a direct Ethernet cable connection. If the port on your Router/Switch/Hub is bad, try a different port.
- **Cabling**: If nothing else works, try using a direct crossover Ethernet cable directly between the computer and the Digi device. Another option is to try another Ethernet cable.
- **Ethernet LED**: Check the Ethernet Link LED on the Digi device. Is the light solid? If not, there is not a valid network connection and it will not be possible to discover the device.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025
㈜테솔 · www.tessol.com TS-TL-DGI-049 173 / 177

- **Network adapters**: Verify that you enabled the correct network adapter and disabled all other network adapters. If more than one network adapter is enabled, the discovery process will fail.
- **Change Digi device**: If you have second Digi device, try discovering it instead to see if you have the same problem. Though it may not solve your original discovery problem, it should provide you with some additional troubleshooting clues.

Rebooting XBee Gateway

You can reboot XBee Gateway as needed. Note that XBee Gateway reboots itself if you make changes to the configuration that require a reboot to activate those changes.

To reboot XBee Gateway, choose one of the following options:

- From Remote Manager, right-click the XBee Gateway device and select **More** > **Reboot**.
- From the web interface, click **Administration** > **Reboot**.

Wait approximately one minute for the reboot to complete.

Troubleshooting LEDs

The table below contains troubleshooting information for the LEDs on the device.

Symptom	Potential Cause	Resolution
Power LED is dark.	Power is not applied.	Ensure that the power supply is properly connected to a power source and the device.
	Hardware failure.	In the unlikely case of hardware failure, first physically remove power and reconnect. If the LEDs remain dark, return the device to Digi for RMA.
XBee LED is dark.[1]	If device is configured as a coordinator, this may indicate a coordinator hardware failure	Return the device to Digi for RMA.
Network LED is dark.[2]	Hardware failure.	Return the device to Digi for RMA.
Network LED is flashing yellow slower than once per second.	No Ethernet link.	Attach an Ethernet cable.
	No Wi-Fi association.	Configure Wi-Fi network parameters. See Wireless (Wi-Fi) network settings.

[1]XBee LEDs remain dark during the initial boot of the device. All diagnosis related to these LEDs must be done after the device has been running for at least 60 seconds.
[2]Network LEDs remain dark during the initial boot of the device. All diagnosis related to these LEDs must be done after the device has been running for at least 60 seconds.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

TS-TL-DGI-049

we measure, we calibrate, we validate. ㈜테솔 · www.tessol.com TS-TL-DGI-049 174 / 177

KOLAS 국제공인교정기관 · ISO/IEC 17025

Symptom	Potential Cause	Resolution
Network LED is flashing yellow faster than twice per second.[1]	DHCP server not responding.	If no DHCP server is present on the network, use a tool with integrated Digi Device Discovery to assign a static IP address.
		Device may not have network connectivity to the DHCP server, despite having link to a hub or switch. Check with network administrator.
Network LED alternates between yellow and green.	Unable to resolve Remote Manager server name. Verify DNS server settings with network administrator.	Network failure between the device and the DNS server. Check with network administrator. See additional information on resolving this issue below.
	Unable to contact Remote Manager server.	Verify Remote Manager server name in settings.
		Verify proxy settings with device and with your network administrator.
	Network failure between the device and the Remote Manager server.	Check with your network administrator.
	Device unable to authenticate Remote Manager server.	Verify NTP server settings with network administrator. The device must have the correct time in order to verify the security certificate presented by the Remote Manager server. The supported means to synchronize time in the device is via NTP. See Cannot connect to NTP time server to get correct time for additional information on resolving this issue.
		Verify Remote Manager server name in settings.

Firewalls and required open ports

When you use a firewall to filter outbound traffic, XBee Gateway requires these network ports to be open for proper operation:

- UDP port **53**, for DNS
- UDP port **123**, for NTP
- TCP port **3199**, for Remote Manager

[1]For devices with both Ethernet and Wi-Fi interfaces, a yellow Network LED will communicate information about Ethernet if there is physical link detected on the Ethernet. Connectivity to Remote Manager over any interface (a green Network LED) always overrides any yellow Network LED indication.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Cannot connect to NTP time server to get correct time

XBee Gateway requires access to an NTP server to set its date and time. Normally the device receives the date and time automatically from the Remote Manager server.

Contact your network administrator or ISP to find out if they have blocked access or have set up other NTP servers on their network. To change the NTP server through the web interface, go to Time settings.

For NTP to operate correctly, UDP port 123 needs to be open.

Cannot connect to DNS server to resolve the Remote Manager server address

XBee Gateway requires a DNS server to resolve the Remote Manager server IP address. Normally the device receives the DNS server information automatically from the DHCP server on your Internet router, but if your router does not provide the information, you may need to set it manually. When this error occurs, the system log will display the following message:

```
Error resolving 'fully qualified domain name': No address associated with
nodename (EAI_NODATA)
```

The device usually gets the DNS server from the DHCP server. If a DNS server is not supplied from your DHCP server, usually because it is not configured to supply it, XBee Gateway uses the default Google Public DNS server (address 8.8.8.8). If use of this default DNS server is not desired, you can manually configure a DNS server using the XBee Gateway web interface or RCI configuration interface.

It is most effective to fix the DHCP server to provide the correct networking parameters to the device. Otherwise, you can manually set the device's network configuration. To set the DNS server manually, go to Ethernet IP network settings. Contact your network administrator or ISP to get the DNS server information.

Need more help?

Digi Technical Support: Digi offers multiple technical support plans and service packages to help our customers get the most out of their Digi product. For information on Technical Support plans and pricing, contact us at +1 952.912.3444 or visit us at www.digi.com/support.

Please provide the following information when you contact Digi Technical Support:

Issue Type	Information to send
All	The Event Log (**eventlog.txt**). In the web interface, go to **Administration** > **System Log** and click **Save All**. The eventlog.txt will be saved in the **/WEB/logging** directory. Screen capture of the device's Home page, for basic information about the device.
Remote Manager connectivity	Screen captures of the device's **Configuration > Ethernet Network** and **Configuration > Device Cloud Connectivity** pages.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.

we measure, we calibrate, we validate.
KOLAS 국제공인교정기관 · ISO/IEC 17025

Issue Type	Information to send
Cellular issues	Screen captures of the device's **Configuration > Mobile Connectivity** and **Administration > Mobile Status** pages.
XBee	Screen captures of the device's **Administration > XBee Firmware Update** and **Administration > Mobile Status** pages.

원문: Digi XBee Industrial Gateway 사용설명서(영문) · 제조사 원문 자료입니다. 사양은 제조사 사정에 따라 변경될 수 있습니다.