

DUOS IOT Gateway

PRODUCT MANUAL

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Informations

This document provides, in detail, all the information about the Duos IoT Gateway. The installation and configuration for the primary application of the product are described in the document "Installation Guide - DUOS" that follows with this product or can be accessed on our website. Tekon Electronics recommends reading this manual before starting any type of configuration or installation of the product.

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1. Introduction

1.1. Overview

The Duos IoT Gateway was developed to enable the communication of the transmitters of the DUOS wireless product family with several IoT platforms on the market, through integration with REST API. As an IoT device developed by Tekon Electronics, the Duos IoT Gateway has a native integration with the Tekon IoT Platform.

The gateway uses the Modbus TCP / IP and Ethernet communication protocols for sending and receiving data to clouds and the Modbus RTU protocol for communications on local networks.

1.2. Accessories / information material included

Along with the Duos IoT Gateway, follow the following materials:

Accessories:

Ethernet cable;

External antenna;

RS-485 converter cable (optional buy);

Mounting and fixing accessory (optional buy);

Technical documents:

Datasheet;

Product manual;

1.3. Symbology

CE	The Duos IoT Gateway complies with European legislation and harmonized European standards for electronic products and can
	circulate freely in the internal market.

X	If the device becomes unnecessary and unused, please do not
X	dispose of it in traditional trash. Place the device in an appropriate
1 mer	waste bin.

Use a QR code reader to access information about the Duos Gateway.	e a QR code reader to access information about the Duos IoT teway.
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1.4 Product references

Reference	Name
PA160410220	DUOS WIRELESS GATEWAY 868MHZ IOT
PA160410240	DUOS WIRELESS GATEWAY 868MHZ IOT WH
PA160410260	DUOS WIRELESS GATEWAY 915MHZ IOT
PA160410280	DUOS WIRELESS GATEWAY 915MHZ IOT WH

2. Product

This topic describes the technical and physical features of DUOS IoT Gateway.

2.1. Technical specifications

Radio Specifications	868 MHz	915 MHz
Range	Up to 4 Km LoS	
Minimum communication distance	3 m @ 27 dBm (500mW)	
Radio transmit power	0 to 27 dBm	8 to 27 dBm
Radio receiver sensitivity	-97 to -110 dBm	
Frequency band	868,05 to 869,95 MHz	902,5 to 927,0 MHz
Wireless channels	16	50
Radio transmission rate	1,2 to 76,8 kbit/s	
Modulation	GFSK	
Encryption method	AES 128 (Advanced Encryption Standard)	

Wireless network		
Maximum transmitters	55	
Maximum hops	13	

Antenna	868 MHz	915 MHz
Range	$\frac{1}{4} \lambda$ dipole with SMA connector, 50 Ohms and +	
	3 dBi g	ain

Power Supply		
External power supply with 12V DC ± 5%		
Maximum current draw of 250 mA		

Serial communication (RS-485)		
Protocol	Modbus RTU (Slave)	
Interface	RS-485	
Baudrates	4,8 kbps to 115,2 kbps	
Data format	8 data bits, no parity/even/odd, 1/2 stop bit	
Available modbus addresses	1 to 247	

Ethernet communication port	
Interface	Porta Ethernet (RJ45)
Speed	100Mbps
IP address	Dynamic (provided by network DHCP server) or
	Static (default) IP
Protocol	Modbus TCP/IP (Server/Slave)
Modbus TCP/IP port	1502
Ргоху	Configurable

IoT connectivity	
Integration with Tekon IoT Platform	
REST API	

Casing	
Dimensions	142 x 73 x 34,5 mm
Weight	100 g
Material	ABS UL94HB/Silicone
Protection index	IP40

Operating environment

–10 °C to 60 °C

95% maximum relative humidity (non-condensing)

Factory default settings	868 MHz	915 MHz
Frequency	869,525 MHz	915,000 MHz
Radio transmit power	27 c	lBm
Radio transmission rate	76,8	 kbit/s
Wireless channel	13	26
Wireless network ID	Serial n	umber
Wireless device ID	Serial n	umber
Configuration time window at startup	10 sec	conds
Serial Communication	RS-485 /	Modbus
Modbus Address	1	L
Baudrate Bits Parity Stop Bits	115200 8	8 None 2
Baudrate (config) Bits Parity Stop	19200 8	None 2
Bits		
Fixed Ethernet IP	192.16	8.100.1
Ргоху	No	ne
NTP server	pt.pool.	ntp.org
WiFi access point		
IP	192.16	8.128.1
Login	adr	nin
Password	adr	nin
SSID	WGW4IOT_ <s< th=""><th>erialNumber></th></s<>	erialNumber>
DHCP	Enal	bled

2.2. Technical Drawings

The Duos IoT Gateway has a compact format compared to the identical category products on the market.



Figure 1 - Technical dimensions of Duos IoT Gateway

2.3. Connections

The physical inputs on the product are located at each end.



Figure 2 - Physical inputs and interfaces of Duos IoT Gateway

2.4. LED Indicators

The DUOS IoT Gateway has a set of LEDs that represent the different behaviors that the device is subject to. The attached table shows the list of each LED, listed from left to right of the technical drawing.

LED	Description
Green LED	Data reception via radio or wireless
Red LED	Data transmission via radio
Blue LED	General status of operations
Red LED	RS485 port communications

Table 1 - LED's colour and description

2.5. Label

The DUOS IoT Gateway is identified with a label that contains information characteristic of the product and necessary for identification and configuration purposes:

- Tekon name and website;
- Tekon's internal product reference;
- Internal device designation;
- Network ID previously configured on the device;
- Wireless channel configured;
- Certification and safety symbols;
- Business group name and address;



Figure 3 - Example of a label pasted on Duos IoT Gateway

2.6 Web interface features

Web-based administration

The gateway services and the transmitters network can be quickly configured through a webbased service.

Role-based access control

Access to the web-based service is restricted only to registered users. The security policy is based on the authentication mechanism through the username and password with a function permission scheme that sets the level of access to certain resources and the authorization to perform certain operations.

Modbus slave-server

Support for Modbus RTU protocol (through RS-485 port) and TCP (Ethernet port). The gateway exposes a Modbus slave (RS485) or Modbus server (TCP / IP) providing all the information of the transmitters connected in a map of holding registers.

Integration with cloud service providers

The DUOS IoT Gateway is incorporated in the Internet of Things, connecting to an application running in the cloud through an IoT platform. Native integration with Tekon IoT Platform. It can be integrated into other external platforms through the REST API interface.

Event-driven, scalable, distributed architecture

Inter-communication between the internal services of the gateway is achieved through a distributed architecture and controlled by events. Messages delivered to multiple recipients at once are carried accross the TCP protocol, which allows applications outside the gateway's network to have access.

3. Updates

Firmware and web interface updates for the Duos IoT Gateway are reserved exclusively for Tekon Electronics. In case of a severe error, contact technical support to assess the problem with your device.

4. Initial configuration

4.1. System requirements

The right use of DUOS IoT Gateway is relying on a set of requirements that must be guaranteed.

4.2. Wireless network

The dedicated wireless network created by the DUOS IoT Gateway allows access to the device directly for consultation and configuration, namely the IP address that was assigned by the network to which it is connected via the Ethernet port.

When connecting to the dedicated wireless network, you can access to the gateway interface by accessing IP address 192.168.128.1. If you are using mobile devices, make sure you have your mobile data turned off.

More information on how to perform these steps can be found in the **DUOS Installation Guide**, in topic 5, available for consultation on the Tekon Electronics website.

5. Web interface

The DUOS IoT Gateway web interface is a tool that provides a graphical interface for the user to access the main features of the device in a convenient way. Their use is different depending on the level of user permissions.

E provinse	
	(in) Tekon loT Gateway
Sign in	
Frank	- manual di sua a

Figure 4 - Duos IoT Gateway web interface login page

Permissions

The access to the platform is restricted to registered users. Users are identified as being administrators or regular users. The permissions associated with the user type limit the action within the tool. The following table shows the limitations for the type of user.

Feature	Permission / Role	Regular	Administrator
		user	
Sensor	Sensor Hub: access sensor hubs list	х	х
Network	Sensor Hub: order sensor hub list	х	х
	Sensor Hub: filter sensor hub list	х	х
	Measurements: access measurements tab	х	х
	Measurements: apply the default filter	х	х
	Measurements: filter by date and time	х	х
	Measurements: filter by sensor type	х	х
ę	Measurements: visualize in real-time	х	х
Sensor Hub	Properties: access properties tab	х	х
susc	Properties: update name		х
Š	Properties: update communication period		х
	Properties: update status		х
	Properties: update description		х
	Properties: forward sensor measurements to the Cloud		х

	Properties: delete sensor hub		х
	Modbus: access the Modbus tab	х	х
	Communication module: access communication module tab	х	x
	Communication module: update baudrate		х
	Communication module: update description		х
	Communication module: update slave id		х
	Communication module: update parity, data bits and stop bits		x
	Users: access user tab	х	х
	Users: update existing user details	х	х
	Users: add new user		х
	Users: delete existing user		х
	Data Import/Export: access data import/export tab	х	х
	Data Import/Export: export sensor measurements	х	х
	Data Import/Export: export sensor measurements for a specific timeframe or sensor hub	х	x
	Data Import/Export: import data base structure		х
SS	Data Import/Export: export database structure		х
Settings	Network: access network tab	х	х
Set	Network: know which IP network interfaces are active	х	x
	Network: configure and test ntp server		х
	Network: configure proxy server		х
	Cloud Service: access the Cloud Service tab	х	х
	Cloud Service: access the Cloud Service Provider configuration		х
	Cloud Service: update Cloud Service Provider details		х
	Cloud Service: validate authentication credentials		х
	Cloud Service: update status		х
	Monit: access Monit tab	х	х
	System: access system tab		х
	System: update hostname		х
	System: update time zone		х
	System: reboot the system		х
	System: shut down the system		х
	System: reset to factory default settings		х

Table 2 - Permissions for each type of user

Home

The **Home** page is the home page presented to the user after logging in. The page information is divided into two blocks. The list of sensors that are connected to the gateway and its status and an overview of the system status.

CONSIGNING GAMMAN HOUSE SERVICE SETTINGS	I stru-
Home	
Most Recent Values	
Store 10 + critica	South
Hub ID Hame	Statur
41 DLICS TELLEY INT FAC	
Severy tin Lof Lorens	Persona 🚺 Neal
Status Overview	
Network	Galeway
# active relides: 1	Optime 128
# wadve tensor Hubs. 0	Cloud Service Adve (Telen Cloud)
# Unoxeen Serear Habs: d	

Figure 5 - Web interface home

Most Recent Values

At the top of the page, we have the *Most Recent Values* table that includes the hub registers grouped with the DUOS IOT Gateway, at the time of configuration. Each row in this table matchs to a hub. Each row contains the following fields about the hubs:

Fields	Description
Hub Id	Number that identifies the hub
Name	Hub name
Status	Hub status

Table 3 - Hub listing fields

On the right side of each record, there is an arrow $\mathbf{\nabla}$ that allows access to the details of the records of the hub.

Most Recent Values		
Show 10 + entries	-Sedirich(
Hub ID Name	Status	
40 DUOS TEMP IST PAG		٠
Type	Value	
TX Model	DUOS TEMP	
Sensor Model	TH2905	
8331	-ti da	
Sensor Hub Cerminication Period	60 s	
Clapited Time	At 1	
Supply Willage	1.1 v	
FW Version	3.0	
#W Version Revision	0	
HW Vesion	33	
Last internal Temperature	22 @ 10	
Last Temperatule	22.69.10	
Last Measurements Timestang:	Thu Nov 21 2016 13 36 50 GMT+0100 (+01)	

Figure 6 - Detailed information on hub registers

Status Overview

At the bottom of the page, there is an overview of the network status, which provides a brief description of the network and gateway status.

Network	Gateway	
A Active Nodes: 1	Uptime: 5:20	
# mactive Sensor Hubs: 0	Cloud Service: Active (Terion Cloud)	
* Unknown Sensor Hubs 0		

Figure 7 - Network and gateway overview

Sensor Network

The network is featured by transmitters associated with the DUOS IoT Gateway. This page lists all transmitters on the network. The listing is organized by various terminal parameters.

(iii) Televitist Gateway HOME SENSOR N	TWORK SETTINOS					ADMIN
Network						
Sensor Hubs						
Show 10 • entities		Search.	Copy	Excel	CSV	PDF
Hub Id II. Name	Firmware Version	II Refresh Time (seconds)			Sta	tus i
40 DUCS TEMP INT FAQ	3.0.0	60				
Showing 1 to 1 of 1 entries				Previous	1	Next

Figure 8 - Network of sensors associated with the Duos IoT Gateway

Fields	Description
Hub Id	Number that identifies the hub
Name	Name assigned to the hub
Firmware Version	Firmware version loaded on the hardware
Refresh Time (seconds)	Update time of registers in seconds
Status	Hub status

Table 4 - Network hubs listing

The list of associated sensors can be copied or exported. The *Copy, Excel, CSV* and *PDF* buttons exemplify the options available.

The user can access the individual information of each transmitter. When you click on the listed register, you automatically access the device's detail page. Depending on the permissions, the information can be consulted and edited. The *Measurements* tab displays measurements taken by the sensor. The *Properties* tab contains all the properties and allows you to configure them. Finally, the *Modbus* tab shows the table with all the information from the modbus registers.



Figure 9 - Graph with the latest registers of the hub

Measurements

The graph on this page shows the transmitter registers that are being received by the gateway. The available filters restrict the user's window of interest and select the variables to be displayed.

NOTE: the graph shows the latest registers. Whenever a new value appears, the oldest is removed from the graph.

Filters

1.1 Default filter

The default filter displays all measurements from the last two hours received by the gateway, from this particular hub. To apply the default filter, click on the *Clear* button at the top of the graph.

1.2 Filter by date and time

The date and time filter allows the display of registers that are between the agreeded time intervals.

How to apply the filter with start date until actual time

- 1. In the **From** filed, click on the icon ^{to} to open the calendar window;
- 2. Select the day, month and year for the start date;
- 3. Within the calendar window, click on the clock icon ^(C) to open the time selection window. This step is optional. When the time is not selected, the selection is made automatically according to the current local time.
- 4. Select the hours and minutes;
- 5. Clean the information in the **To** field and click on *Filter*.

How to apply the filter with a time interval

- 1. In the **From** filed, click on the icon th to open the calendar window;
- 2. Select the day, month and year for the start date;
- 3. Within the calendar window, click on the clock icon ^(O) to open the time selection window. This step is optional. When the time is not selected, the selection is made automatically according to the current local time.
- 4. Select the hours and minutes;
- 5. In the **To** field, click on the icon 🛛 🗮 to open the calendar window;
- 6. Replicate steps 2 to 4;
- 7. Click on *Filter*.

1.3 Filter by sensor type

At the top of the measurements graph, click on the sensor type label (Internal Temperature, Temperature, RSSI, Battery Voltage, etc.) to enable or disable the visibility of the data in the graph. When the tag is crossed out (for example, RSSI), this parcel is hidden.



Figure 10 - Options to filter data in the chart

Viewing options

2.1 See graphic lines

Set from the beginning, the values are displayed on the graph through points that are positioned according to the value and date of registration. To hide the line drawn through the points, click the *Hide plot lines* button at the top of the graph.



Figure 11 - Hub chart with hidden lines

2.2 Enable real-time measurements updates

In addition to viewing the measurement history, you can view the measurement log in real time. Click on *Realtime Measurements Update* button, located at the top of the graph. When you activate this option, the **From** and **To** fields are empty since the records are appearing in real time.



Figure 12 - Option to update the chart with new registers

The graph will be updated as measurements arrive at the gateway from the hub that we are currently visiting.

To disable this option, click on *Realtime Measurements Update* button again.

Properties

Select which hub you want to consult. In the top menus of the hub page, click the *Properties* tab. This page lists the information related to the hub.

Belean for Gatoway HOME SERIES	RINETWORK SETTINGS	1 40MH+
Sensor Hub - 40		
Measurements Properties Mode	us.	
Properties		
Name	DUOS TEMP INT FAG	
System Id	1.0.0.39	
Network Id	1001	
Firmware Version	3.0.0	
Communication Period (seconds)	60	
Status	AGTIVE	*
Description		
Synchronize to Cloud	. On	
	00 00 00 000	10 Dekter 12 Update:

Figure 13 - Hub properties page

Fields	Description
Name	Hub name
System Id	Communication protocol id
Network Id	Communication protocol network id
Firmware Version	Hub firmware version
Communication Period	Communication period in seconds
(seconds)	
Status	Hub state
Description	Hub additional information
Synchronize to Cloud	Sync enable/disable button of sensor hub

Table 5 - Properties page fields and description

3.1 Change hub name

Change the text field with the desired information. UTF-8 characters are allowed.

3.2 Change communication period

Set the communication period you want for the hub. Only numeric characters (0 to 9) are accepted and always values bigger than zero.

3.3 Change hub status

The hub status indicates if DUOS IoT Gateway is storing the hub registers. The status can be of 2 types:

ACTIVE	Allows to store the received registers.
INACTIVE	Disables the possibility to store the received sensor registers. All other registers are discarded.

Table 6 – Possible hub states

From the menu list, choose the state you want to assign to the hub and click on the **Update** button to save the changes.

NOTE: by default, the initial state of the hub is "Active".

3.4 Update description

Insert the text in the *Description field*. UTF-8 characters are allowed.

3.5 Enable sending registers to the Cloud

When a hub is initially registered at the gateway, sending data to the cloud is disabled by default.

To redirect data to the cloud, change *Synchronize to Cloud* state to **ON**.

To deactivate, click on the **On** button which will be replaced by the **Off** button.

Click on the *Update* button to save your changes.

NOTE: for this feature to be applicable, you must have at least the Tekon Cloud cloud service configured and validated.

3.6 Delete a hub

Click on *Delete*. A pop-up window will show up, click on *YES*, *DELETE* to confirm the action.

NOTE: this operation is irreversible. The measurements and the map of modbus registers are deleted.

Modbus

In the **Modbus** tab, the modbus parameters of the transmitters that are associated with the DUOS IoT Gateway are displayed. Select which hub you want to consult. In the top menus of the hub page, click on the **Modbus** tab. This page lists the information related to the hub.

Fields	Description	
Register Variable	Transmitter registration variable	
Actual Value	Value registered for the variable	
Register Address	Register modbus address	
Register Value	Register values in hexadecimal format	
Register Type	Type of object linked to the register	
Register Format	Register data format	

Table 7 - Modbus data

ensor Hub - 40					
(easurements Properbes	Modbus				
Modbus					
Show 25 * entries				1	Search:
Register Variable	Actual Value	Register Address	Register Value	Register Type	Register Format
Transmitter Medel	DUOS TEMP	810	0x000003	Holding Register	URVT16
Prote Sensor Model	TK900.4	620	0x000001	Holding Register	LINT 16
RSSI	-22	821	0x00002C	Heiding Register	URVT16
Communication Period	00	822	0x00005C	Helding Register	UINT16
Elapsed Time	50	823	0x000014	Holding Register	URVT16
Power Supply Voltage	5.1	824	0x050053	Holding Register	LINT16
FW Version Major Minor	3.0	825	0x000300	Holding Regeter	UNTS_UNTS
FW Version Revision	0	028	0x000000	Holding Register	URVT16
	3.3	827	0x000303	Holding Register	UNTS_UNTS
HW Version Major Minor			0x410.00000	Holding Register	DOUBLE
HW Version Major (Minor Last Internal Temperature	20.75	829	000010000000	CONFIDENCE INCOME	DOUDLE.

Figure 14 - Hub modbus registers

Settings

In this menu we have access to advanced system configurations such as the configuration module preferences, management of user permissions and credentials, data export, import and export configuration files, list of the modbus register map, configuration of cloud services, monitoring the state of the gateway services, reset and shut down the system, etc. To access the **Settings** menu, click on the button with the same name in the menu at the top of the page.

The **Settings** menu is arranged in several tabs that are presented in this order:

- **Communication Module**: communication module settings;
- Users: users management;
- Data Import/Export: export sensors measurements, database structure with gateway configuration and import gateway configurations;
- **Network**: network interfaces;
- Cloud Services: configure cloud services;
- Monit: service access monitoring tool;
- System: system configuration and control;

NOTE: each task that will be described in the following steps can only be performed by users with Administrator permissions or users with custom permissions.

Televito T Galeware HOME Set	SOR NETWORK NET THEIR	1 *
ettings		
Communication Montale Banna	Dala Ingert Experi	
Communication Module		
tion#+	Tering Multime States	
Stokes	Adino	
Description	Telisn Washer matuka	
interface Type	LIANT	
Pen	(dev/by51	
Finquancy	12200	÷.
Panty	Nono	
Dete Bits	. e .	
Stop Bits	3	
Raio IB	3	

Figure 15 - Communication Module page of web interface

4.2 Communication Module

In this tab, it's possible to perform the following tasks:

- Update the communication frequency of the module;
- Update module description;
- Update the slave module ID;
- Update parity;

NOTE: changing parameters of the communication module such as parity or communication speed can result in strange behaviour and leave the system inoperable. These parameters must be changed by specialized personnel.

4.2.1 How to update the module description

The description configuration can be used to establish the context of a communication module.

In the **DESCRIPTION** field, insert the desired text. UTF-8 characters are accepted.

4.2.2 Update the modbus communication speed

The communication speed is expressed in bits per second (bps) or in frequency (Hz), it refers to the number of bits that the gateway and the communication module exchange per unit of time

In the **BAUDRATE** field, click on the configured option and select one of the available values in the selection box that will be displayed.

NOTE: this field should only be changed if the equipment's settings are modified with the Tekon Configurator software. The settings applied in Tekon Configurator must be replicated in this tab.

4.2.3 Update parity value

The parity configuration is directly related to communication via Modbus protocol.

In the **Parity** field, click on the configured option and select the desired value in the selection box that will be displayed.

4.2.4 Update slave module ID

The slave id is used to identify the slave address of the modbus.

In the **SLAVE ID** field, enter a single slave address between values 1 and 247.

NOTE: this feature is only available on base Omega2 + gateways.

Hitle Levingerin		- I ×	Characterian and int	DON METATION INTERNO	R /1014
ic ivus liela			Settings		
* Transfilms * Biload Biload Biload Biload	Sona Fort Camparaton Part Name Route 20042 - Route 2003 - Party Name - Rantas Basal Rond	Cartyperposition	2010-002-5	ternetter tern terlinen ter det tern	
B THTUT		12	Michiele	Tata-Unities.See	
D 11/201	Gebever Tunisher Thirperitive		Set a	*10	
23 10 4201	Moduo Calipadae		Description	Spring Marking and Spring and Spr	
() THE 232	Mideal Galaxy		Ministrative Types	LART	
CHANNEL .	Matus Sectors (1972) a		Base	insertiple .	
C Distant	Nodau Perty New +	Gatomay #15Mints	Preserve)	61108	+
 By DN Ball By DV E11 	Water Second F: 7	PW v8.03 HW v1.0	7441	7610	1
A TUUTERS	Weter Owned 20		Tata Dire		
 Wisches Wisches 	 Market and Control and Control 		10.50		
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Table 8 - Modbus address identification fields

4.3 Users

In this tab, it is possible to manage all users who can use the gateway's web interface.

The USERS tab allows to:

- Edit information of existing users;
- Delete users;
- Create users;

Each user has the following attributes:

- Username username used to log in;
- Password password that validates the username in the session;
- First name user's first name;
- Last name user's last name;
- Admin indication if user has administrator permissions;

Settings					
Communication Module	Users Data Import/Exp	art Nelwork Oltrad Service	s Luga Marit Byster		
Users					
Username	Password	First Name	Last name	Admin	
admin		Azhranishiadar	Breatur	Yes	(3. Millio)
use		Ullizator	Bresknar	No	@ Manage

Figure 16 - Page with list of registered users

4.3.1 Access USERS tab

Inside the main **SETTINGS** menu, click on the **USERS** tab.

You will be directed to a page like the one shown above.

4.3.2 Update user details information

1. In the table where all registered users are listed, on the right side, click on **MANAGE** in the user register that you want to edit.

2. A form will appear as shown below.

Username	user
Password	
First Name	Utilizador
Last Name	Bresimar
Admin	0

Figure 17 - Form to update user information

3. Do your changes. Please note the following conditions:

- FIRST NAME and LAST NAME attributes are optional. It can be left blank.

- the role of Administrator can be assigned by clicking on the ADMIN checkbox.

4. Click on *Update* to save the changes.

NOTE 1: username and role of administrator cannot be changed.

NOTE 2: When you make changes to your own user account, your session will be closed, and you will be automatically redirected to the login page.

NOTE 3: if your user type of account is REGULAR USER, in this tab, you can only update your own information.

4.3.3 Add a new user

To create a user, you must fill a form. Click on ADD USER> header to reveal the form.

Fill in **USERNAME** and **PASSWORD** fields. The username cannot be the same as any existing one. You can optionally fill in the fields **FIRST NAME** and **LAST NAME**;

Click on the **ADMIN** checkbox if you want to assign administrator permissions to the new user. Click on **ADD** button to create the user account.

d User	
Username	
Password	
First Name	
Last Name	
Admin	

Figure 18 - Form to create a new user

4.3.4 Delete user

1. In the table where all registered users are listed, on the right side, click on **MANAGE** in the user register that you want to edit.

2. A form will appear as shown below.

Username	user
Password	
First Name	Utilizador
Last Name	Bresimar
Admin	0

Figure 19 - Form to delete user

3. Click on *DELETE*.

NOTE: the predefined administrator cannot be deleted.

4.4 Data Import/Export

On SETTINGS menu, select the tab DATA IMPORT/EXPORT.

Token Ist Galaxy HOVE 1	ENSOR NETWORK	TINGS			1 1000
Settings					
Communication Module Users	Cata Import/Export	Network Cloud Service	is Mone S	ystem	
Export Sensor Measurement	ts				
Select Time Range 0					
From	📰 То				
Select Sensor Hubs 0 0			Select all Hubs	Belect none	
and a state			opersecuto.	CODEST MANE	Bearch:
Hubid II. Nor	ne	II Firmware Version		Refresh Time (seconds)) IT Status IT
40 DU	DG TEMP10T FAQ	3.0.0		60	•
Showing 1 to 1 of 1 antrics					Previous I Next
					A Download CSV
Import Database Structure	>				
Export Database Structure	>				

Figure 20 - Page to export data and import database

4.4.1 Export sensor measurements

1. On the main menu *SETTINGS*, click on the tab *DATA IMPORT/EXPORT*.

2. Click on the sensor hubs from which the registers will be exported. Use the shortcut CTRL + Click to select multiple hubs or click on **SELECT ALL HUBS**, if you want to select all hubs. If you choose to select all hubs and want to undo the selection, click on **SELECT NONE**.

3. Click on *DOWNLOAD CSV* button to export the data.

4.4.2 Export sensor registers from a specific date or hub

In addition to exporting all measurements registered in the system, it is possible to export registers for a specific time interval for a single sensor.

- Exportar registers from a date until now

- 1. In the **From** field, click on calendar icon (¹) to open the calendar window;
- 2. Select day, month and year for the start date;

- On the calendar window, click on the clock icon (^O) to open the time selection window. This step is optional. When the time is not selected, the selection is automatically made according to the current local time;
- 4. Select hours and minutes;
- 5. Select the hub that will provide the registers. Use CTRL+Click to select multiple hubs or click on *SELECT ALL HUBS*, to select all hubs available;
- 6. Leave the field TO blank and click on DOWNLOAD CSV

- Export registers from a time interval

- 1. In the **From** field, click on calendar icon (¹) to open the calendar window;
- 2. Select day, month and year for the start date;
- 3. On the calendar window, click on the clock icon (^O) to open the time selection window. This step is optional. When the time is not selected, the selection is automatically made according to the current local time;
- 4. Select hours and minutes;
- 5. In the **To** field, click on the calendar icon to open the calendar window;
- 6. Replicate steps 2 to 4.
- 7. Select the hub that will provide the registers. Use CTRL+Click to select multiple hubs or click on *SELECT ALL HUBS*, to select all hubs available
- 8. Click on *DOWNLOAD CSV*.

4.4.3 Import a database structure

- 1. Click on the IMPORT DATABASE STRUCTURE header to reveal this section;
- 2. Click on BROWSE ... button to open a window for file search;
- 3. Select the ".sql" file;
- 4 Click on IMPORT SQL

4.4.4 Export a database structure

- 1. Click on EXPORT DATABASE STRUCTURE header to reveal this section;
- 2. Click on **DOWNLOAD SQL** to extract the ".sql" file with the database structure;

3. As an option, you can choose to delete saved settings from cloud services or hubs from the database. To do so, select **CLOUD SERVICES** or **SENSOR HUBS** respectively, from the **EXCLUDE** section;

4.5 Network

Within the SETTINGS menu, select the Network tab.

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lettings						
Communitation Med	tale Users	Data InperVEquet	Nelwork Cloud Service	n Loge Want	Spalarra	
P Network Tabl	6					
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Interface	Lt DHOP	IP Ackiress	Nermosie	Gateway	MAC Address	
eth0	Examined	192.165.0.137	235 253 253 0	192.155.0.250	AD #3 6 biež 1 mác	Dr manage
18	Usabled	127.0.0.1	255.0.0.0		00.00.00.00.00.00	
(30	1163060	192 168 128 1	285 255 258 258 0		40 43 YED C2 TC 84	
Showing 5 to 3 of	3 entries.					Prestata I Not
4TP						
NTPOSe		pi post rep os	ē.			
at test						Sk Update
Proxy Configura	ation					
HTTP Proxy						
HITTP Proxy						

Figure 21 - Network information

On this page we find the network interfaces of the device, the configuration of the network time protocol and the parameters for the configuration of a proxy.

4.5.1 IP Network Table

On this page section, is presented a table that lists the several interfaces of the gateway network and their status or configuration. The interfaces are listed based on the following parameters.

Interface parameters	Description
Interface	Network interface name
DHCP	DHCP protocol status associated with the interface for automatic or manual IP assignment
IP Address	Current interface IP address
Netmask	Network mask address
Gateway	IP address of the network gateway (in most common installations, refers to the DHCP server)
MAC Address	Interface MAC address

Table 9 - Fields with network information and description

Stiow 10 +	entries				Search:	
Intertace	11 DHCP	II IP Address	11 Natmask	IT Gateway	11 MAC Address	
entra	Ensibled	192,158.0.137	255 255 255 0	152.166.0.250	40.83.50 c2.1c.4c	@ Manage
ia	Decteard	127.0.0.1	255.0.0.0		00.00.00.00.00.00	
190	Disabled	192,158,128,1	255 255 255 0		40.a3.65.c2.1c.4a	

Figure 22 - IP Network Table section

4.5.1.1 eth0 interface management

Within the **eth0** interface, referring to the ethernet interface of the DUOS IoT Gateway, it is possible to configure the DHCP, IP Address, Netmask and Gateway parameters. This feature allows the assignment of the gateway IP, within the network, to occur automatically or manually.

Click on the **MANAGE** button to open the interface configuration window.

Contraction 1994. (U	STATISTICS STATE		1.4
ettings	Manage interface e	eth0.	
	Interface	. e#0	
formerikation Mathie	DHCP		
P Network Table	IP Address	192.155.0.151	
Show in + protes	Netmask	200 200 200 0	Search
Interface II DHCP	Cateway	1912 (1910-154	#55 II
000 E14060	MAC Address	-98 58 6602 1C-46	Tatilat D Morage
a Taster			d (00 00)
ad disabet		Cose Stuppale	EX:33
Senaray 1 to 5 of 3 senates.		1	Press Page
ALL A			
NUTTING	the book sub-oid		
at nex			10 UD 1944
Proxy Configuration			

Figure 23 - DHCP activation

In the **eth0** interface management window, for the IP Address, Netmask and Gateway parameters to be editable, you must uncheck the DHCP parameter checkbox validation.

DUOS IOT GATEWAY

attings	ALLANCE COLORED		-	
	Interface	+90		
mmunitis priveduit Unom	DHCP	0		
Network Table	IP Address	922 (62.0.127		
Thin + miles	Netmask	290 200 200 0	Sector/	
Interface () DidDP	CONWON	192-193-0-250	***	
wish Findlet	NAD Address	00.85 K0 (2.1) At	E trate	-Of Manage
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Index. Decision (1997)		Otes S upara	2.Ac.ta	teanis 🚺 Noc
TP				
NTP Poer	proprietory			
				The local se

Figure 24 - DHCP deactivation

NOTE: for the IP assignment to our device to be done automatically by the network server to which it is connected via the ethernet port, must keep validation in the DHCP parameter checkbox. If the IP assignment occurs automatically, the parameter value will be "Enabled". If you choose to manually assign the IP, the value returned will be "Disabled".

4.5.2 NTP

The acronym NTP stands for Network Time Protocol, which assumes the role of establishing the time window that the server is using as a reference associated with recording the date and time of all processes.

You can choose to use the time server configured on your network server or choose to use an external server.

ΓP		
NTP Peer	pt post rep regi	
QC Ther		S Uppile

Figure 25 - Network Time server configuration

You can enter an address identical to the one in the image above or you can include a time server using its IP address. At the end of the configuration, you can test the connection to the time server using the **Test** button.

If the connection fails, the error message **Invalid NTP** will be displayed. If the defined server is valid, the message displayed will be **Valid NTP**.

4.5.3 Proxy Configuration

The user chooses to include a proxy server as an intermediary. The supported proxy servers are from HTTP or HTTPS type.

HTTP Prosy	
HTTPS Prasy	
	5 005

Figure 26 - Proxy server configuration

4.6 Cloud Services

In this tab, the credentials are configured and tested to enable the sending of data to the Tekon IoT Platform.

Within SETTINGS menu, click on the CLOUD SERVICES tab.

Teamlat Caloway Hitlet	велесе четновк сеточов					L ACVIN
Settings						
(International Margania Salah	a Deballmasteriopert (New	cite Classi Servicia	Light 69	nd System		
Tekon Cloud						
Saver URL	ttip Vict10 lokonoli	chanics.com				
API Key	084452759164-011	-9006-102/0e#03637e				
8028./5	04					
0) Test Cardentais					🖂 Validale Credentials	B Update
Tekon Gloud - Seneo	r hube configuration					
stow in + entre	•				search	
HUDID	Name			8580/6		
40	DUOS TOUR INT TWO			Cloud Synchronica	lan Dri	
Showing 1 to 2 of 2 error	e:				INDHOUS 1	74003

Figure 27 - Page to configure the connection to Tekon IoT Platform

The connection with the Tekon IoT Platform is made through the configuration of gateway and hubs, individually.

4.6.1 Configure gateway connection

To connect the gateway to the platform, you must have the following data:

Server URL – platform url;

API Key – unique identifying key used to authenticate the gateway on the Tekon IoT Platform, from an existing user on the platform with permissions to send data;

After gathering this data, follow these steps:

- 1. Insert the data gathered in the corresponding fields;
- 2. Click on the *Status* button. The button should go from Off to On.
- 3. Click on *Update* to save changes.

Server URL	Mg darts second tonus one	
APT Key	classich liete etc. solit, meneticitate	
Status	Cm T	

Figure 28 - Connection to the Tekon IoT Platform

On the **TEST CREDENTIALS** button, you can test the platform connection credentials defined in the upper fields. If the connection is successful, the message "Authentication Ok" will be displayed. If the connection is not viable, the error message "Authentication Failed" will be displayed to the user.

The **Validate Credentials** option, allows the credentials to be given as valid and saved in the database as the correct ones. If the credentials have not been tested and are incorrect, the connection will not be made.

4.6.2 Configure hubs connection

In this section you will find the list of hubs that are connected to the gateway. The list consists on the Hub ID, the hub name and the communication status of the hub.

NOTE: for the hub to be ready to communicate with the platform, its status must be "Cloud Synchronization On". If this status does not match, please follow the steps in 3.3

In order for the available hubs to communicate with the Tekon IoT Platform, you must have the following data:

API Key – API KEY key of the datasource that is configured on the platform;

After gathering the necessary information, follow these steps:

- 1. Select the hub that you pretend to configure;
- 2. Insert the API Key from the platform datasource;
- 3. Click on *Update* to save changes.

Show	v iii * entries	Search		
	Hub ID Name	Status		
	40 DUGS	TEMP10T FAQ Cloud Synchronization On		
	API Kéy	1e99660%-7c1c-4170-bbf/2-1420002/C3S7		
	o‡ Test Credetaals	🔛 Verdate Credentaes	E upoate	

Figure 29 - Hub configuration for connection to the Tekon IoT Platform

On the **TEST CREDENTIALS** button, you can test the platform connection credentials defined in the upper fields. If the connection is successful, the message "Authentication Ok" will be displayed. If the connection is not viable, the error message "Authentication Failed" will be displayed to the user.

The **Validate Credentials** option, allows the credentials to be given as valid and saved in the database as the correct ones. If the credentials have not been tested and are incorrect, the connection will not be made.

4.7 Monit

The DUOS IoT Gateway follows with a web monitoring tool provided by third parties, called **Monit**, which allows monitoring the status of the process, files, directories and other system resources. The **Monit** tool is configured to monitor critical services necessary for the normal functioning of the gateway. In the event of an error, **Monit** will note the occurrence and put in place steps to recover, such as, for example, automatically restarting the monitoring services whenever they are unexpectedly closed.

4.7.1 How to access Monit

- 1. On the SETTINGS menu, click on the MONIT tab;
- 2. Click on *Go to Monit Web Portal* link.

(in) Telsan lait Gateway	iowie se	NSOR NETWORK SET	TRAGE					1 ADMIN+
Settings								
Communication Module	Users	Data Import/Export	NETWORK	Cloud Services	Logs	Monit	System	
		G	So to	Monit W	eb F	orta	l.	

Figure 30 - Page with the link to Monit Web Portal

1. In the new window, place the access credentials provided below;

Username	admin
Password	bresimar

Table 10 - Credentials for access	
-----------------------------------	--

Thisrief Centrey HORE SENSOR SETTING	A Aparty-
Settings	
Conveniences Module Listes Data transfiliation (Printmass Modula Cloud Service) Logis Store Toylater	
Go to Monit	
Authoritation Tequined X	
Desperitorial (2011) (2011) de 2012 à companying para commerce cont promover. The sole anges "become"	
Para lines Francisch DK Dance	
U. U.	

Figure 31 - Window to enter credentials

- 2. Click on **OK** to validate credentials;
- 3. It will be redirected to the Monit interface, the Monit Service Manager;

		Monit Servi	ce Manager		
		HALL CREAT A DECK) amende and management.		
System.	Otation	Loud	CPU	Versory	Swop
Teos, Terrenta	Tunty .	DOLEDNA KOOK DE	2 Water, 1 White & Manuel	37.05 (SA A MI)	(7.2% pt)ut
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agreen per	Teatra .	24.770	0.0%		145 (1765
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dealers oper	Name of Street o	2% 21er	3.16		DEN 3/ 2NE
inicitation in	TLANCE	378,2745	7.2%		235 (2284)
OUTSTANK!	101115	28.271	105		LAN (20 ML)
forciend	Trents.	28.77m	1.2%		40.95 (50.954)
322	952270	218.210	20%		BIN (MUM)

Figure 32 - Monit Service Manager page

The **Status** column of the table that lists the monitored process indicates whether or not the process is functioning normally.

NOTE: the description of how to use the Monit tool is out of focus in this manual. You can find more information on the tool owner's documentation page: <u>https://mmonit.com/documentation/</u>

4.8 System

In this page you will have access to information about the DUOS IoT Gateway. You can also perform control actions on the device since the factory settings are reset and the gateway is restarted and shut down.

To access this section of the interface, within the SETTINGS menu, click on the SYSTEM tab.

These statistics of the second	NOR NEMORE	TINOS						I. ADAM
Settings								
Communication Module Users	Ustri Importitione	P Network	Mottes	Cloud Services	Linge	Monit	Nystern	
Gateway								
Hostname								
omegeZp								
Timezone								
GMT+1								(t)
								fb Uprote
Control Galeway								
O Reset to Factary Defaults							S Reboil	Ø Sheldowe

Figure 33 - General settings of web interface

4.8.1 Update hostname

1. In the **HOSTNAME** text field, type the new name you want for the device. Only alphanumeric characters (A-Z; a-z; 0-9) are accepted;

2. Click on **UPDATE** to apply the change. The system will automatically restart for the change to take effect immediately.

3. Follow the presented instructions.

NOTE: the hostname identifies the gateway of the local IP network. Once changed, the gateway can be detected and accessed on the local IP network through the new hostname with the suffix ".local"

4.8.2 Update timezone

1. Click in the field below the name *Timezone*.

2. From the menu of listed options, choose the timezone you want to set.

3. Click on **UPDATE** to apply the change. The system will automatically restart for the change to take effect immediately.

4. Follow the presented instructions.

4.8.3 Reboot the system

1. In the Control Gateway section, click on Reboot;

Televenter Calanaus HCME III	SOR NETWORK RETTING	A ANY
Settings	Really Reboot?	
o tungo	To you really wish to rebot the galaxiay? This process will take some time.	
Communication Module Libers	Close 13 Reboot	Byessen
Gateway		
Hestrame		
ompilp		
Timazone		
Gist+1		
		S Optime
Control Gateway		
		13 Risboot C Studiows

Figure 34 - Reboot system option

2. Follow the presented instructions.

4.8.4 Shutdown the sistema

1. In the Control Gateway section, click on Shutdown;

ettings	Really Shutdown?		
Communication Manuae Univers	Do you really visit to shuldown the geteway? This process will take some time.	Austern	
Galeway	Close 🔮 Shubban		
Hostname			
unwindh Devezone			
DATE:			
			名 Update
Control Gataway			

Figure 35 - Option to shutdown the system

2. Follow the presented instructions.

NOTE: this procedure does not turn off the DUOS IoT Gateway. It just turns off all the services.

4.8.5 Reset factory settings

ATTENTION: this action resets the system settings to their initial state. Any changes made will be discarded in this process.

1. In the Control Gateway section, click on *Reset to Factory Defaults*;

2. A validation window will appear. Click on **Reset** to continue. The system will automatically restart for the change to take effect immediately.

TELES HET Gelenesy HOME SET	Really Reset Gateway?				
Settings	(interior content)				
	Do you needly wish to reveal the galaxies to time	lectory defaults	7 This process will take some		
Communication Storide Users				1711mT	
Galeway		Close	O Reset to Factory Defaults		
Ganemary					
Hospane					
orregalo					
Timatone					
CINTAT					1.
					E Update
					El organite
Control Geteway					
D Reset to Factory Defaults				Ch. Rebool	d Stutteen

Figure 36 - Reset initial settings on the web interface

3. Follow the presented instructions.

4.9 Modbus connections

The DUOS IoT Gateway has a Modbus layer that allows the customer to connect via the RS-485 port or the Ethernet interface. The connection parameters to the Modbus server are as follows:

Modbus RTU	Modbus TCP
Rate: 115200	Address: gateway IP address
Parity: None	Port: 1502
Data bits: 8	
Stop bits: 1	

Table 11 - Data for connection via Modbus

Once connected, requests for reading and writing can be carried out in the registers. Currently, the allocation of addresses to registers follows the protocol in the following table.

Description	Address
Transmitter model	(Transmitter device ID - 1) x 21
Probe sensor model	(Transmitter device ID - 1) x 21+1
RSSI	(Transmitter device ID - 1) x 21+2
Communication period	(Transmitter device ID - 1) x 21+3
Elapsed time	(Transmitter device ID - 1) x 21+4
Power supply voltage	(Transmitter device ID - 1) x 21+5
FW version Major Minor	(Transmitter device ID - 1) x 21+6

FW version revision	(Transmitter device ID - 1) x 21+7
HW version Major Minor	(Transmitter device ID - 1) x 21+8
Data 0	(Transmitter device ID - 1) x 21+9
Data 1	(Transmitter device ID - 1) x 21+11
Data 2	(Transmitter device ID - 1) x 21+13
Data 3	(Transmitter device ID - 1) x 21+15
Data 4	(Transmitter device ID - 1) x 21+17
Data 5	(Transmitter device ID - 1) x 21+19

Table 12 - Modbus map

Can find more information on data transmission via Modbus from the DUOS IoT Gateway in the product datasheet. You can find the datasheet, on the Tekon Electronics website, through the upper menu Download Center >> Product Datasheets >> Datasheet - DUOS Gateway IoT.

6. Troubleshooting

6.1 IP address not automatically assigned

When the DUOS IoT Gateway is connected to the network via the Ethernet port, the network must be prepared to automatically assign an IP to the device.

If this step is not done automatically, there is no DHCP server, which provides and assigns IP addresses automatically, on your network. Check your network for a DHCP server.

Verifique o estado do parâmetro DHCP, na interface **eth0**. Se o valor devolvido for igual a *Disabled*, clique no botão *Manage* presente no fim do registo. Na nova janela exibida, clique na caixa de validação em frente ao parâmetro *DHCP*, e em seguida clique em *Update*.

Check the status of the DHCP parameter, on the **eth0** interface. If the returned value is equal to **Disabled**, click on **Manage** button at the end of the register. In the new window that appears, click on the validation box in front of the **DHCP** parameter, and then click on **Update**.

6.2 The device is not sending data to the Tekon IoT Platform

Check if the hub status is ACTIVE;

Start by checking if the gateway is receiving data from the transmitters. Click on the Sensor Network item in the main menu, select a hub and on the Measurements tab analyze if some data is being registered.

Make sure the **Synchronize to Cloud** field on the hub page is **ON**;

Check if the Tekon Cloud **Status** field is in ON mode (see topic 4.6.1 Configure gateway connection)

Check if you have filled in the API Key field in the Tekon Cloud area and the hub (s) that should be communicating. (See point 4.6 Cloud Services)

6.3 Cannot access to the gateway web interface

Check the access credentials. The username is admin and the password is admin. If you have changed your access data and have not registered it, contact Tekon Electronics technical support.

7. Certifications

The Duos IoT Gateway is a device manufactured in compliance with the following standards:

EN 61326-1 - Class B - Industrial requirements

EN 300 220-2 V3.1.1

EN 301 489-1 V2.2.0

EN 301 489-3 V2.1.1

8. Glossary

Terms	Definition
DHCP	<i>Dynamic Host Configuration Protocol:</i> used to configure network identifiers automatically.
Gateway	Device with physical interfaces capable of communicating with networks and devices using different protocols and processing and storing internal or external data locally in the long term.
Ethernet	Connection architecture of local networks based on sending packets.
Communication Module	Plug-in that provides wired or wireless connection to local or remote sensors, respectively, through the communication protocol. The communication modules can be connected directly to the expansion of the bus (physical interface) of the gateway, to increase its communication resources.
Cloud Service Provider	External or third-party entity hosted on the Internet, providing IoT services. The main features of an IoT

	platform are device management, remote data storage, access to historical data and real-time monitoring.
Modbus	Data communication protocol used in industrial automation systems.
NTP	Network Time Protocol. Used to keep a system's timekeeping synchronized with a time server.
Sensor hub	Device that supports one or more sensors capable of periodically obtaining measurements for different variables.
loT	Internet Of Things



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