

VEGA LORAWAN CONFIGURATOR

1.0.82 Version

User Manual

www.vega-absolute.ru



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Introduction



This manual is designated for application "Vega LoRaWAN Configurator" developed by Vega-Absolute OOO for work with LoRaWAN[®] end devices manufactured by Vega-Absolute OOO.

The manual is intended for users of this software and equipment.

Vega-Absolute OOO reserves the right to make changes to the manual related to the improvement of equipment and software, as well as to eliminate typos and inaccuracies, without prior notice.



The "Vega LoRaWAN Configurator" application (hereinafter referred to as the configurator) is intended for setting up the device via USB.

Before connecting the device to the computer for the first time, you must install the driver for the COM port stswstm32102, which can be downloaded from <u>iotvega.com</u> site from any device page. After running the executable file VCP_V1.4.0_Setup.exe, the installer window will appear:





In this window, you need to click **Next**, then **Install**, and after that the installation will begin. When the installation will have been successfully completed, the following screen appears:

🙀 Virtual Com port driver V1.4.0 - InstallShield Wizard					
	InstallShield Wizard Completed				
	The InstallShield Wizard has successfully installed Virtual Com port driver V1.4.0. Click Finish to exit the wizard.				
	< Back Einish Cancel				

After pressing Finish the driver is ready for operation, - you may connect the device via USB.

For the connection to the device, perform the following steps:

- 1. Connect the USB cable to the device.
- 2. Run "Vega LoRaWAN Configurator" application.



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The "Vega LoRaWAN Configurator" application does not require the special installation. When the executable file is launched, the window for working with the application appears

3. Click the "Connect" button in the menu on the left.

The application automatically recognizes the type of device, and the device selection menu becomes inactive.

💈 Vega LoRaWAN configurat	or		>
vega	LORaWAN setting	s 🚺 Vega SI-11	Language: English 💌
A B S O L U T E Iode:	ABP info	OTAA info	
Simple 🔹	Device address:	819609EA Device EUI:	
evice model	Application session key:	Application EUI:	
Vega SI-11 v2 👻	Network session key:	Application key:	
诺 Connect	Devicel info	Network info	
× Disconnect	Device model:	Vega SI-11 v2 Join status:	Joined
	Device time (UTC):	12.01.2023 08:44:39 Device address:	180004DE
	Firmware version:	VEGA SI-11 3.0b5EU Warranty packet	t counter: 41
	Protocol version:	2.0	
	Production date:	12.12.2022 07:07:12	
	FSK key:	8B1D3333B6DAC2C8	
	🛃 Update	firmware	
	Check for	updates	(••) Join network

The configurator supports the ability to manually select the COM port of the device, which allows you to connect several end devices via USB at the same time and launch several program windows. Thus, in each window, you can configure and view different devices connected by the different COM ports. To select a COM port, you need to switch to the "Expert" mode.



2. Connection via USB-UART-converter

When implementing this connection method, you will need a USB-UART-converter device.

To connect you will need:

- 1. Connect the USB-UART converter to the device and the USB port of a personal computer.
- 2. Run the «Vega LoRaWAN Configurator» application.
- 3. To activate UART expose the magnet to the Hall sensor and wait for the LED signal¹.
- 4. In the «Vega LoRaWAN Configurator» switch to the Expert mode in the menu on the left, select the device model and the assigned COM port. After that, click the "Connect" button.

The program will automatically recognize the device type and the device selection menu will become inactive.

ldress: 819609E In session key:		Key management Edit device keys
		Edit device keys
n session key:		
	Application EUI:	Reset keys to default
session key:	Application key:	
,	Network info	Link check
odel: Vega SI-11 v	/2 Join status: Joined	d Quality: 0000
ne (UTC): 12.01.2023 09:21:2	21 Device address: 180004DE	Gateways count: 0
version: VEGA SI-11 3.0b5E	U Warranty packet counter: 4	
version: 2.	.0	
n date: 12.12.2022 07:07:1	12	
8B1D3333B6DAC2C	28	
🛃 Update firmware		
in e	ime (UTC): 12.01.2023 09:21: e version: VEGA SI-11 3.0b5E version: 2 on date: 12.12.2022 07:07: : 88 ID333386DAC2C	Vega SI-11 v2 Join status: Joine mime (UTC): 12.01.2023 09:21:21 Device address: 18000/DE e version: VEGA SI-11 3.0b5EU Warranty packet counter: 4: version: 2.0 on date: 12.12.2022 07:07:12 5: s: 88 ID 333386DAC2C28 8 1000000000000000000000000000000000000

It will connect to the device as if it was directly connected via USB.

¹ When the device is powered by external power, the UART output is active by default



FSK radio channel allows remote connection and customize LoRaWAN[®] device in a distance up to 100 meters in the absence of line of sight.

To connect via FSK you will need:

- Special device FSK dongle, which connects to PC via USB like any other LoRaWAN[®] device,
- FSK key is an individual LoRaWAN[®] device key which you are connecting to.

FSK key can be found in QR code on the device package label also it can be checked during the connection in configurator's «Information» tab.

Device info	LoRaWAN settings	†↓† Vega SI-11
ABP info		
Device address: Application sessi Network session		33E3435C
Devicel info		
Device model:		Vega SI-11
Device time (UT	C):	30.08.2021 02:04:43
Firmware version	n:	VEGA SI-11 3.0b3EU
Protocol version	:	unknown
Production date	:	18.08.2021 06:55:26
FSK key:		4C065BAA7E264F6B
	🛃 Update firmware	

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The connection procedure is as follows:

- 1. Connect FSK dongle to PC via USB
- 2. Run «Vega LoRaWAN Configurator» application
- 3. Click «Connect» button in left menu

Application will automatically recognize device type and device model menu will be inactive.

4. Click «Get settings» button and make sure frequency plan matches to frequency plan of LoRaWAN[®] device you plan connect to via FSK.

5. Click «Connect to device via FSK».

😻 Vega LoRaWAN configurate	or			-	
	†↓† FSK dongle		Satting	Language: Eng	plish 🔻 🚺
Mode:	Device model:		Settings		
Expert 💌	Firmware version:	Vega FSK dongle FSK dongle 0.1	Region:	RU868	•
Device model Vega FSK dongle 👻		te firmware	TX power:	14 dBm	•
COM4 - C	Connection				
ቻ Connect	Connect to	device via FSK			
× Disconnect					



6. Insert FSK key of the device in appears window and click «OK».



The connection to the device will occur as if it were connected via USB, but a window with FSK communication parameters will appear in the menu on the left. All settings are performed as with USB connection, using the buttons «Get settings» и «Save settings».

😻 Vega LoRaWAN configurat	tor				– 🗆 X
VEGa	LoRaWAN settings	†↓† Vega SI-11			Language: English 💌 🚺
A B S O L U T E Mode:	ABP info		OTAA info		Key management
Expert Device model Vega SI-11 v2	Device address: Application session key: Network session key:	819609EA	Device EUI: Application EUI: Application key:		Edit device keys Reset keys to default
COM4 ~ 🕞	Devicel info		Network info		Link check
Connect	Device model: Device time (UTC):	Vega SI-11 v2 12.01.2023 10:38:06 VEGA SI-11 3.0b5EU	Join status: Device address: Warranty packet counter:	Joined 1800042C 45	Quality: 00000 Gateways count: 0
FSK RSSI: -30 dBm In: 480 b/s	Firmware version: Protocol version: Production date: FSK key:	2.0 12.12.2022 07:07:12 8B1D3333B6DAC2C8			
Out: 513 b/s	Update firmware				
	Check for updates	s	(•) Join network		(+) Link check
	Device output				
	[12.01.23 17:35:24] :Starting FSK exchange	e in 431ms on 868.5 MHz			



4. Application Interface

«Vega LoRaWAN Configurator» application is designed to configure the device via USB or remotely via FSK.

The configurator has two operation modes – «Simple» and «Expert». In «Simple» mode only basic settings are available, in «Expert» mode basic and advanced settings are available. As an example, the work of the application with the terminal device Vega SI-11 v2 in the «Expert» mode is considered.

😻 Vega LoRaWAN configurato	pr				– 🗆 X
VEGa	LoraWAN settings	†↓† Vega SI-11			Language: English 🔻 🚺
A B S O L U T E Mode:	ABP info		OTAA info		Key management
Device model	Device address: Application session key: Network session key:	819609EA	Device EUI: Application EUI: Application key:		Edit device keys Reset keys to default
сом7 - С	Devicel info		Network info		Link check
Connect	Device model: Device time (UTC): Firmware version: Protocol version: Production date: FSK key: Update firmware		Join status: Device address: Warranty packet counter:	Joined 180004DE 41	Quality:
	Check for update:	S	(•) Join network		(••) Link check
	Device output				



The left side menu allows you to switch between the "Simple" and "Expert" operating modes, select a device model, select a COM-port, connect to, or disconnect from a device.

In the upper section there are three tabs: Device info, LoRaWAN® settings and device settings.

The language selection and about application menu is in the upper right corner.

🕿 File server	
Export settings	
▲Import settings	
Get settings	
 Apply settings 	

The "File Server" button allows you to access the client for downloading firmware files, software, drivers, user manuals and other materials directly through the "Vega LoRaWAN Configurator" application.

The buttons "Export settings" and "Import settings" allow you to save a set of settings to a file and then load them from a file.

To read the settings from the device, you need to click the "Get settings" button, until this the application will display the default settings or from the last connected device.

After making the necessary changes to the settings, you should click the "Apply settings" button and only then disconnect from the device with the "Disconnect" button.



5. «Device info» Tab

The "Device info" tab displays information about the device, its status, and the data needed to register the device in the LoRaWAN[®] network.

Device info	WAN settings			Language: English 💌
BP info		OTAA info		Key management
Device address:	8196	PEA Device EUI:		Edit device keys
Application session key: Network session key:		Application EUI: Application key:		Reset keys to default
evicel info		Network info		Link check
Device model: Device time (UTC): Firmware version: Protocol version: Production date: FSK key:	Vega SI-1 12.01.2023 10:0 VEGA SI-11 3.0 12.12.2022 07:0 8B1D3333B6DA0 date firmware	2:53 Device address: 5EU Warranty packet counter: 2.0 2:12	Joined 180004DE 42	Quality: 0 Gateways count: 0
Che	ck for updates	(••) Join network		(•) Link check
evice output				

ABP info - displays the data necessary to register the device in the LoRaWAN[®] network with ABP method (Activation By Personalization).



OTAA info - the data required to register the device in the LoRaWAN[®] network with OTAA method (Over The Air Activation) is displayed.

Key management (not displayed in the "Simple" mode) - allows you to change the factory keys to register the device on the network, as well as reset the keys back to default settings.

Device info - the configurator reads information about the device model, its firmware and automatically corrects the device's time when connected to it. This section contains the FSK key required to connect to the device remotely.

When the application connects to the device it automatically checks for new firmware and, if necessary, offers to download it.



If you do not update the firmware at this step, then a notification will appear in the corresponding field on the Device info tab.



Device info	LoRa LoRaWAN settings	†↓† Vega SI-11	
ABP info			
Device address:		819609EA	
Application sessi	on key:		
Network session	key:		
Devicel info			
Device model:		Vega SI-11 v2	
Device time (UTC	C):	12.01.2023 10:13:52	
Firmware version	n: VEC	GA SI-11 3.0b5EU 🛕	
Protocol version:	:	2.0	
Production date:	:	12.12.2022 07:07:12	
FSK key:		8B1D3333B6DAC2C8	
🛃 Update firmware			
Check for updates			
	ABP info Device address: Application sessi Network session Devicel info Device model: Device time (UTC Firmware version Protocol version Production dates	ABP info Device address: Application session key: Network session key: Devicel info Device model: Device time (UTC): Firmware version: Protocol version: Production date: FSK key: Update firmware	

Update firmware - allows you to select the firmware file from your computer's hard drive and load it into the device. The device will automatically disconnect from the configurator when the download is complete. The current version of the device firmware can be downloaded from <u>iotvega.com</u> from the page of corresponding product or on the file server using the client built into the "Vega LoRaWAN Configurator" program.

Check for updates - allows you to check firmware updates directly via "Vega LoRaWAN Configurator".

Network info - shows whether the device is connected to the LoRaWAN[®] network and its network address. This section also displays the number of packets sent by the device since the first time it was turned on.



Join network button (does not work when FSK connection is used)- launch the LoRaWAN[®] network connection procedure with the previously selected ABP or OTAA method. If the device is already connected to the network, reconnection procedure will occur.

Link check (not displayed in the "Simple" mode, does not work when FSK connection is used) - when pressed, the device sends a special signal to the LoRaWAN[®] network, in response to which the network informs it of the number of gateways that received this signal and the signal quality. This button only works when the device is connected to the network.

Link check	
Quality:	
Gateways count:	2
(••) Link check	

Device output (not displayed in the "Simple" mode) - monitoring the device status, all events in real time are displayed.



6. «LoRaWAN settings» tab

The "LoRaWAN Settings" tab allows you to configure various parameters of the LoRaWAN® network.

Device info	†↓† Vega SI-11	Language: English	•	Ø
Region:		RU868 💌 Edit		
Activation type:		ΟΤΑΑ	•	
Confirmed uplinks:		Unconfirmed	•	
ADR:		Enabled	•]
RX1 offset:		1 second	•	
Join accept delay 1:		5 seconds	•	
Uplink number of transmission:		1 time	•	
TX power:		14 dBm	•	
TX datarate:		DR0 SF12 BW125	Ŧ	

Region - allows you to select one of the frequency plans available on the device or set custom frequency plan. The custom frequency plan operates on the basis of the EU-868 frequency plan.

Region:	EU_868	Edit
	RU_868	
	Custom	



In the device frequency plan, only those channels are active by default, on which sending requests for connection to the network (join channels). The remaining channels (that the device should use) can be transferring by the LoRaWAN[®] network server during the device activation procedure (only OTAA).

If you select "Custom" in the "Region" field, you must manually specify the frequencies that the device will use. To do this, click the "Edit" button, the channel frequency editing window will appear:

Join frequency 1 (Hz)	0	Channel 9 frequency (Hz)	0
Join frequency 2 (Hz)	0	Channel 10 frequency (Hz)	0
Join frequency 3 (Hz)	0	Channel 11 frequency (Hz)	0
Channel 4 frequency (Hz)	0	Channel 12 frequency (Hz)	0
Channel 5 frequency (Hz)	0	Channel 13 frequency (Hz)	0
Channel 6 frequency (Hz)	0	Channel 14 frequency (Hz)	0
Channel 7 frequency (Hz)	0	Channel 15 frequency (Hz)	0
Channel 8 frequency (Hz)	0	Channel 16 frequency (Hz)	0
RX2 window frequency (Hz)	ol	RX2 window datarate	DR0 -
			Ok

This frequency plan allows you to set up to 16 channels, as well as the frequency and speed of the second receiving window.



The first three channels and the second receiving window parameters are mandatory. Without these parameters the custom frequency plan will be considered empty

Activation type – selecting ABP or OTAA device activation method.





Activation type:	ΟΤΑΑ
	ABP

Confirmed uplinks – set up confirmation of the packet delivery.

Confirmed uplinks:	Confirmed
	Unconfirmed

With the "Confirmed uplinks" option turned on, the device will retry sending the packet until it receives the server confirmation, or until the "Uplink number of transmission" is over (see below), then device completes the communication session until the next one according to the schedule. In this case, the device continues to collect data according to the data collection period and store it in memory.

Non-transmitted packets remain in the device memory until the next communication session.

When the device black box overflows, the oldest packages will be overwritten with new ones

With the "Confirmed uplinks" option turned off, the device just sends all accumulated packets to the network in order from the earliest to the latest. There are no checks of package delivery in this mode. After communication session there are no non-transmitted messages in the device memory.

ADR – this option activates the Adaptive Data Rate algorithm for automatic control of the data transfer rate from the LoRaWAN[®] network server side. The higher the quality of the signal received by the network, the higher the speed will be installed on the device. This option is recommended only on permanently installed devices.



ADR	:	Enabled
		Disabled

RX1 offset (not displayed in the "Simple" mode) – specifies the time between end of packet transmission and first receiving window opening. The second receiving window always opens after 1 second after the first.



Join accept delay (not displayed in the "Simple" mode) – sets the time that the device will open the first receiving window to receive confirmation for the join request from the LoRaWAN[®] network while OTAA mode active. The second window always opens after 1 second after the first.



	1 second
	2 seconds
	3 seconds
	4 seconds
	5 seconds
	6 seconds
	7 seconds
Join accept delay 1:	8 seconds
	9 seconds
	10 seconds
	11 seconds
	12 seconds
	13 seconds
	14 seconds
	15 seconds

Uplink number of transmission (not displayed in the "Simple" mode) – if the "Confirmed uplinks" function is disabled, the device will simply send each packet as many times as specified in this option. If "Confirmed uplinks" is enabled, the device will send packets until it receives a confirmation or until it sends as many packets as specified in this option.



	1 time
	2 times
	3 times
	4 times
	5 times
	6 times
	7 times
Uplink number of transmission:	8 times
	9 times
	10 times
	11 times
	12 times
	13 times
	14 times
	15 times

TX power (not displayed in the "Simple" mode) – the device RF transmitter power is adjusted to this value when sending packets to the LoRaWAN[®] network. This option can be changed by the network server.

	2 dBm
	5 dBm
	8 dBm
TX power:	11 dBm
	14 dBm
	20 dBm



TX datarate (not displayed in the "Simple" mode) – the device transmission data rate at which it will transfer packets to the LoRaWAN[®] network. This speed can be changed by the network server if the ADR algorithm is enabled.

	DR0 SF12 BW125
	DR1 SF11 BW125
	DR2 SF10 BW125
TX datarate:	DR3 SF9 BW125
	DR4 SF8 BW 125
	DR5 SF7 BW125



ERROR	POSSIBLE REASON	USER ACTIONS
Image: Second constraints Image: Connection with device is lost OK	Incorrect COM port selected when connecting in «Expert» mode	Try to choose another COM port or reconnect in «Simple» mode. In «Simple» mode configurator looks over all COM ports, till finds the one it can connect.
Error × Device is found, but it's busy OK	The specified COM port is being used by another program	Carry out the procedure for connecting the device again.



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