Programming FieldGuard LoRaWAN Stations.

If you order a complete FieldGuard Station from our website it normally comes pre-configured with the correct settings and keys to work out of the box. In some cases you might need to change certain settings because of changes in the sensor configuration, measurement interval, LoRa Network Operator etc. Below is a description of how you can connect your FieldGuard Station to your computer and make changes in the Stations configuration.

Connecting your FieldGuard Station to your computer.

Connect the FieldGuard Station to your computer (You need a USB to Mini USB cable). Connect the Mini USB connector to your FieldGuard Station (this connector is on the backside of the Small LoRa Module (see picture below)). When you connect the USB cable to your computer you should hear a sound.



In some cases you (depending on operating system en computer hardware) your FieldGuard Station doesn't connect immediately. If you don't hear the connection sound go to your device manager and check if the computer detected the FieldGuard Station in the correct way and assigned a COM port to the device (see picture below)



If your computer connected in the correct way to your FieldGuard Station, you should see a Serial USB-device (COMx) appear in your Device Manager. In This case the FieldGuard Station Connected to COM6. If your station didn't connect correctly click with the right mouse button on this COM port and then on Switch Off. After that repeat this but then select Switch On. In most cases the second time is OK (otherwise repeat this procedure).

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Installing the ComTest Software

For Programming the FieldGuard Stations you need to install our ComTest Software onto your computer. If you don't have the ComTest Software Available on your computer you can download a copy of this software from our website: <u>http://fieldGuard-stations.com/downloads</u>.



In General there are 3 types of Settings that you might need to change:

- 1. <u>Connection keys</u> (provided by your Local telecom Provider or from TTN (the things network).
- 2. <u>Station Configuration settings</u> (measurement interval)
- 3. <u>Sensor Configuration settings</u> (battery level and type of sensor and sensor port)

Of these keys these configuration settings the sensor type settings are the hardest, but no worries we will guide you through the process.

1. Connection keys

Let start with the connection keys. These keys are provided to you either by your (LoRa) telecom provider (like KPN in the Netherlands) or by TTN (the things network). In most cases ESTEDE will provide the keys to you (or are already programmed into the FieldGuard Station). However, to make a connection to the LoRa Network we need 3 keys: Device EUI, Application EUI and the App Key (see picture below). Example Keys provided by TTN (the things network) for this instruction.

	Device EUI	\diamond	ţ	A8 61	0A 33 37	3A 60 0B				
Арр	lication EUI	\diamond	₽	70 B3	D5 7E D0	03 1B 7B	Å			
	Арр Кеу	\leftrightarrow	Ļ	ø					· [1]	
c 🗮	onnected to: COM4	Serieel US	B-appar	aat , Comte	st RS232			-	_ ×	Use the lower Transmit Field
Con	nport M4 Serieel USB-appara	at Disconn	ect	Baudrate 110 300 600 1200 2400	 4800 9600 14400 19200 38400 	5600057600115200	Parity none odd even mark space 	Handshaking none RTS/CTS XDN/X0FF RTS/CTS + XDN/X0FF	Databits 5 6 7 8	in your ComTest software to transmit the configuration keys to your FieldGuard Station.
Tran	ave CLEAR cledA8610A3 clea70B3D57 clak23E79D0 amit CLEAR	3373, ED00 9476E SET DT 3373,	A600I 31B7I 1C5A R C	BOK BOK A4B2BC	E23D991	Add date.]	Receive end of line: Transmit end of line:		To write the Device EUI, Application EUI and App Key to the correct address in the FieldGuards processor you need to use the commands as described below: CLED -> Device EUI
	clea70B3D57	ED003 9476E	31B7E	3 4B2BCE	E23D991	06D4			~	CLEA-> Application EUI CLAK-> App Key
Conne	cica to: Colvia j selle	ei opp-ah	paraac	manismittet	. 0005040000	oooox citz				

CLED -> Writes the Device EUI to the FieldGuard Station. Enter CLED plus the Device EUI provided by your provider in the Transmit field en press ENTER (See picture above). When the command is accepted by the FieldGuard Station it will respond with an OK (in the picture above in red).

CLEA - > Writes the Application EUI to the FieldGuard Station. Enter CLEA plus the Application EUI provided by your provider in the transmit field and press ENTER.

CLAK -> Writes the AppKey to the FieldGuard Station. Enter CLAK plus the App Key provided by your provider in the transmit field and press ENTER.

2. <u>Station Configuration Keys</u>

Station keys are simple. Just like to entering the connection keys you need to enter the write commands into the lower (Transmit) field of the Comtest software. There is actually only 1 station key available for programming:

CLI this command programs the measuring interval period for the station

The minimum interval period between 2 measurements is 300 seconds (5 minutes). This is due to regulations set by the LoRa specification. In order to program the interval period we need to use Hexadecimal values for the interval time (300 seconds in HEX. Is 12C), but the total length of this field is 8 bytes so therefore this becomes 0000012C.

Command Example (setting the interval period to 5 min. will therefore be):

CLI0000012C

	paraat , Comtest RS232			-			seconds	HEX	Command
Comport	Baudrate		Parity	Handshaking	Databits		First hour		
COM4 Serieel USB-apparaat 🗸	0 110 0 4800	0 56000	none	none	05		300 sec	12C	CLI0000012C
Connect Disconnect		 57600 115200 	 odd even 	O RTS/CTS O XON/XOFF	0 6		600 sec	258	CLI00000258
	○ 1200 ○ 19200	0 110200	🔿 mark	O RTS/CTS + XON/XOFF	. 8		900 sec	384	CLI0000384
	○ 2400 ○ 38400) space				1200	480	CLI00000480
Receive CLEAR	HEX	Add date/tin	me	Receive end of line: <pre></pre>	~]	1500	5DC	CLI000005DC
CLI0000012COK (resp	onse to the com	mand below	v in the	transmit field)	^		1800	708	CLI00000708
				,			2100	834	CLI0000834
								1	
						_	2400	960	CLI00000960
							2400 2700	960 A8C	CLI00000960 CLI00000A8C
						-	2400 2700 3000	960 A8C BB8	CLI00000960 CLI00000A8C CLI00000BB8
							2400 2700 3000 3300	960 A8C BB8 CE4	CLI00000960 CLI00000A8C CLI00000BB8 CLI00000CE4
					~		2400 2700 3000 3300 3600	960 A8C BB8 CE4 E10	CLI00000960 CLI00000A8C CLI00000BB8 CLI00000CE4 CLI00000E10
Transmit CLEAR SET DTR	CLR DTR SET RTS	CLR RTS		Transmit end of line: CCR>	~		2400 2700 3000 3300 3600 4 hours	960 A8C BB8 CE4 E10	CLI00000960 CLI00000A8C CLI00000BB8 CLI00000CE4 CLI00000E10
Transmit CLEAR SET DTR	CLR DTR SET RTS	CLR RTS		Transmit end of line: CR>	v ~		2400 2700 3000 3300 3600 4 hours 14400	960 A8C BB8 CE4 E10 3840	CLI00000960 CLI00000A8C CLI00000BB8 CLI00000CE4 CLI00000E10 CLI00003840
Transmit CLEAR SET DTR	CLR DTR SET RTS	CLR RTS		Transmit and of line: CCR>	~		2400 2700 3000 3300 3600 4 hours 14400 ½ day	960 A8C BB8 CE4 E10 3840	CLI00000960 CLI00000A8C CLI00000B88 CLI00000CE4 CLI00000E10 CLI00003840
Transmit CLEAR SET DTR CLI0000012C	CLR DTR SET RTS	CLR RTS		Transmit end of line: CCR>	~		2400 2700 3000 3300 4 hours 14400 ½ day 43200	960 A8C BB8 CE4 E10 3840 A8C0	CLI00000960 CLI00000A8C CLI00000B88 CLI00000CE4 CLI00000E10 CLI00003840 CLI0000A8C0
Transmit CLEAR SET DTR CLI0000012C	CLR DTR SET RTS	CLR RTS		Transmit end of line: CCR>	× ×		2400 2700 3000 3300 4 hours 14400 ½ day 43200 1 day	960 A8C BB8 CE4 E10 3840 A8C0	CLI00000960 CLI00000A8C CLI00000B88 CLI00000CE4 CLI00000E10 CLI00003840 CLI0000A8C0

Example 2.

Let say we want to change the interval from once every 5 minutes to once every hour. Then we need to enter the command as below in the Transmit (lower) field of the Comtest software:

CLI00000E10

The response in the Receive Field (upper) would then be:

CLI00000E100K

3. Sensor Configuration settings

This section is a little bit harder to comprehend. The command to write the sensor configuration to the FieldGuard Station is 000304 followed by the sensor configuration setting (see image below).

This configuration setting consists just like the measuring interval of 8 bytes. Depending on the type of sensor(s) that are connected and to which port the value of each byte can differ. Below is a description of each byte in relation to the connected sensor and used port:

Sensor Configuration Setting



Connected to: COM4 Serieel USB-app	araat , Comtes	t RS232					
Comport						- (_ ×
COM4 Serieel USB-apparaat	Baudrate -			Parity	Handshaking		Databits
oo min joon oo oo opparaat	0 110	0 4800	0 56000	none	none		0 5
	0 300	9600	0 57600	🔘 odd	O RTS/CTS		0 6
Connect Disconnect	0 600	0 14400	0 115200	🔘 even	O XON/XOFF		07
	0 1200	0 19200		🔘 mark	O RTS/CTS + XON/	XOFF	8
	0 2400	38400		o space			
Receive CLEAR		HEX	Add date	/time	Receive end of line:	CR>	~
000304000021010K <cr></cr>							~
					-		~
Transmit CLEAR SET DTR	CLR DTR	SET RTS	CLR RTS]	Transmit end of line:	:CR>	~
Transmit CLEAR SET DTR	CLR DTR	SET RTS	CLR RTS]	Transmit end of line:	:CR>	~
Transmit CLEAR SET DTR	CLR DTR	SET RTS	CLR RTS]	Transmit end of line:	:CR>	> >
Transmit CLEAR SET DTR	CLR DTR	SET RTS	CLR RTS]	Transmit end of line:	:CR>	> >

This is what it looks like when you enter the sensor configuration command in the COMtest software.

In the Transmit Field (Buttom) you enter 00030400002101.

In the Receive Field you should receive 00030400002101OK (command + OK) so that you know that the config command was received in the correct way.

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Result

The complete configuration for a FieldGuard Station should look similar to the example below. In this case 5 Commands:

Cled: writes the Device EUI to the station

Clea: writes the Application EUI to the station

Clak: writes the App Key to the station

Cli: writers the measuring / transmit interval to the station

000304: writes the sensor configuration to the station

000300: writes battery report to the station (00000000 = no bat. Level / 00000001 = bat. Level)

the connected to: commit peneer obb-appa	araat , Comtest RS232				-	\times
Compot COM4 Seriel USB-apparaat	Baudrate 110 4800 300 9600 600 14400 1200 19200 2400 38400	 56000 57600 115200 	Parity none odd even mark space	Handshaking none RTS/CTS XON/XOFF RTS/CTS + XOP	N/XOFF	oits
Receive CLEAR	HEX	Add date	/time	Receive end of line:	<cr></cr>	~
ClakAB/AFE6ABE2FC7B2B2AEF944A755 cli000003840K <cr></cr>	SBD030K <cr></cr>					
						<
Transmit CLEAR SET DTR	CLR DTR SET RTS	CLR RTS		Transmit end of line:	<cr></cr>	 ~
Transmit CLEAR SET DTR CLedOOCIT2A078A39823 CLe3070857670823A2F944A755 CLA0000394 00030400000003	CLR DTR SET RTS	CLR RTS]	Transmit end of line:	< <u>CR></u>	 > <

The Total Configuration of your FieldGuard Stations should look like this (depending on required sensor configuration, interval and connection keys.)

After entering each key / command press ENTER and verify if you get an OK for this command in the Receive Field.

If you need help configuring you station feel free to contact ESTEDE | Technologies or your local dealer to help you with the station configuration.