



FOX4 Series Hardware Manual

FOX4 – 4G

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Revision History

Date	Rev.	Comments
April 2024	A	Initial version
July 2024	B	Added RS485 communication
August 2024	C	Removed cancelled SKUs
February 2025	D	Changed the upper value of the input power supply range for the FOX4-4G device Updated SKU and region details for FOX4 CAT1 Updated cellular network and band details for SKUs Added information for Dead Reckoning feature
June 2025	E	Added battery to package contents, and added battery related information to relevant sections Removed SIM from package contents, and updated SIM related information in relevant sections Removed Lantronix Connectivity Services Added section 10.5 IMDA certification

For the latest revision of this product document, please check our online documentation at www.lantronix.com/support/documentation/.

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1 Introduction

This product manual is intended for qualified personnel who are well skilled in electronical/electrical installation and not for private consumers/end users. Only qualified personnel should install, implement, or operate the product.

The product status described in this document may have changed since first publication and therefore the information in this document about the product status may be outdated. The latest product information is available on the [FOX Series](#) product page of the Lantronix website.

1.1 Models

FOX4-4G devices are compact all-in-one devices with powerful integration capability. The FOX4-4G models use 4G communication network. The following FOX4 series models are available:

- FOX4-4G-M1-BLE
- FOX4-4G-C1-BLE

The table below lists the device SKUs with respect to region of operation and serial communication options on the accessory port:

Devices	SKU	Regions	Fallback	Serial Communication Options on Accessory Port
FOX4-4G-M1-BLE	F43H102S	Europe	2G	RS232 and I2C
	F43H502S			RS232 and RS485
	F43R202S			RS232 and I2C
	F43H20FS	North America, with global coverage	NA	RS232 and I2C
	F43H50FS			RS232 and RS485
	F43H207S	Japan		RS232 and I2C
	F43H507S			RS232 and RS485
FOX4-4G-C1-BLE	F44H102S	Europe	3G, 2G	RS232 and I2C
	F44H502S			RS232 and RS485
	F44H104S	ANZ, Latin America	3G, 2G	RS232 and I2C
	F44H504S			RS232 and RS485

Table 1: FOX4-4G Models and SKUs

Note: SKU F43R202S supports dead reckoning feature.

The FOX4-4G devices provide analog ports and integrate with 1-Wire interface. The 1-Wire interface supports connection with multiple sensors such as iButton, Temperature Logger, Temperature Sensor, Humidity sensor etc.

1.2 Key Features

You can use the available PREMIUM features for mobile data logging, storing, processing, and sending. The required hardware options can be decided shortly before installation depending on the application. FOX4-4G can act as a mobile client for various applications like AVL, fleet management, security, and recovery of assets. The device offers firmware features like: TCP DATA ENCRYPTION, several HISTORY MODES, ECO-DRIVE/BEHAVIOR LOGGING, and Dead Reckoning beside standard items like status reports, messaging alerts, and Geo-fencing. The FOX4-4G units are delivered with re-chargeable Li-ion battery. You have to purchase a SIM from a mobile provider and register it into the GSM network before installing in the device.

The setup and configuration of the device is performed through Serial Ports, over SMS and TCP using PFAL commands and the Workbench Software configuration tool. These PFAL commands are unique to AVL devices and can be used for all communications including Serial, SMS, CSD,

TCP, and SMTP. Refer to the PFAL Command Reference (see [1.7 Related documents](#)) for more details.

Geofence features for territory management, route verification, prohibited locations, parking area, and exception reporting for events such as arrivals, departures, deliveries, pick-ups, illegal entries, unauthorized movement etc. are implemented in the firmware. FOX4-4G contains a data-logger (history feature) that enables archiving of unique vehicle locations in sequence up to approximately 231 days with an archiving interval of 20 seconds.

Dead Reckoning technique available on select models allows you to maintain high-accuracy positioning when GNSS-only positioning is difficult or impossible, in areas where satellite signals cannot be received such as tunnels, underground passages, areas surrounded by tall buildings etc.

The physical interface to the device's application is made through integrated main and accessory ports as well as the 10pin mini-USB port. These ports are required for controlling the units, receiving GPS location data, transferring data, power supply, extending the number of I/Os, and to use additional external devices which are not integrated in the In-Vehicle Computers.

FOX4-4G devices can be configured and integrated onto any asset platform such as:

- Trailers
- Trucks
- Delivery vans
- Rail cars
- Industrial vehicles and more

1.2.1 Applications

- Real time online tracking
- Fleet management / monitoring
- Security / emergency services
- Real time satellite navigation
- Territory management
- Personalized drivers' logbook
- Route verification
- Trip management / Distance calculations
- Theft protection
- Toll collection / pay as you drive
- Eco-Drive - (PREMIUM feature)
- Encrypted TCP communication based on AES 128-bit algorithm - (PREMIUM feature) and more

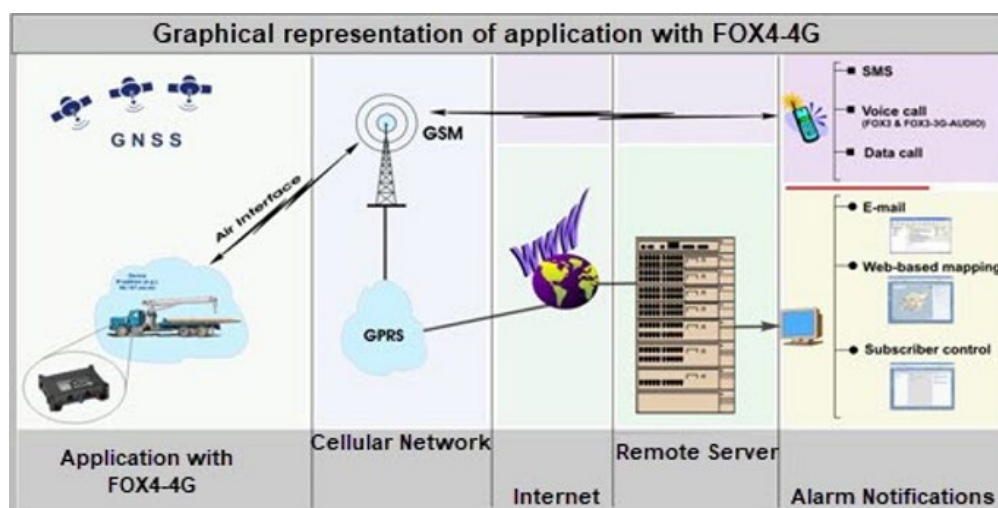


Figure 1: GSM/GPRS/LTE and GNSS based vehicle tracking applications with FOX4-4G

1.3 Lantronix Services

Lantronix PercepXion - PercepXion is a cloud or on-premises portal for the centralized management of Lantronix devices. A browser-based interface (including mobile phone app support) that allows an administrator to view status, logs and charts, update firmware and configuration, view and edit telemetry, execute PFAL commands, and monitor Lantronix devices.

1.4 Package Contents

FOX4-4G devices are shipped with the following contents:

- FOX4-4G device
- Re-chargeable Li-ion battery
- Cover and 2 screws
- SIM cover
- Mounting instructions

1.5 Accessories and Premium Features

Order accessories and premium features separately.

For accessories and premium features visit <https://www.lantronix.com/products/fox-series/>.

To order, contact Lantronix sales at <https://www.lantronix.com/about-us/contact/>.

1.6 Circuit concept

The architecture of the FOX4-4G devices consists of the following components:

Architecture Integrates
Quad-Band GSM/GPRS module
GNSS receiver (GPS + GALILEO + GLONASS) - GLONASS needs to be activated
Wi-Fi and BLE module
ARM7 processor controlling system functions
Inside SIM card holder (1.8/3V SIM cards)
Internal GSM/GNSS/Wi-Fi antennas
Main Port (Power, RS232 port, I/O ports)
Accessory Port (1-Wire, RS232 port, I ² C interface)
10pin mini-USB port (incl. SPI & USB)
GSM, GNSS & Wi-Fi antenna ports (for external antennas)
Physical Interfaces
1 x Power supply lines
3 x Multi-line I/O
1 x Ignition
3 x LED indicators
2 x RS232 port (RX, TX, GND) V24
1 x USB port
1 x SPI interface (for IOBOX-MINI/BT/CAN)
1 x 1-Wire port
1 x I ² C port*
1 x RS485 port*
3 x External antenna ports

8 x Mounting Holes

Table 2: FOX4-4G Architecture

*The FOX4-4G Accessory Port provides either I²C or RS485 function depending on the device SKU. Refer to section [1.1](#).

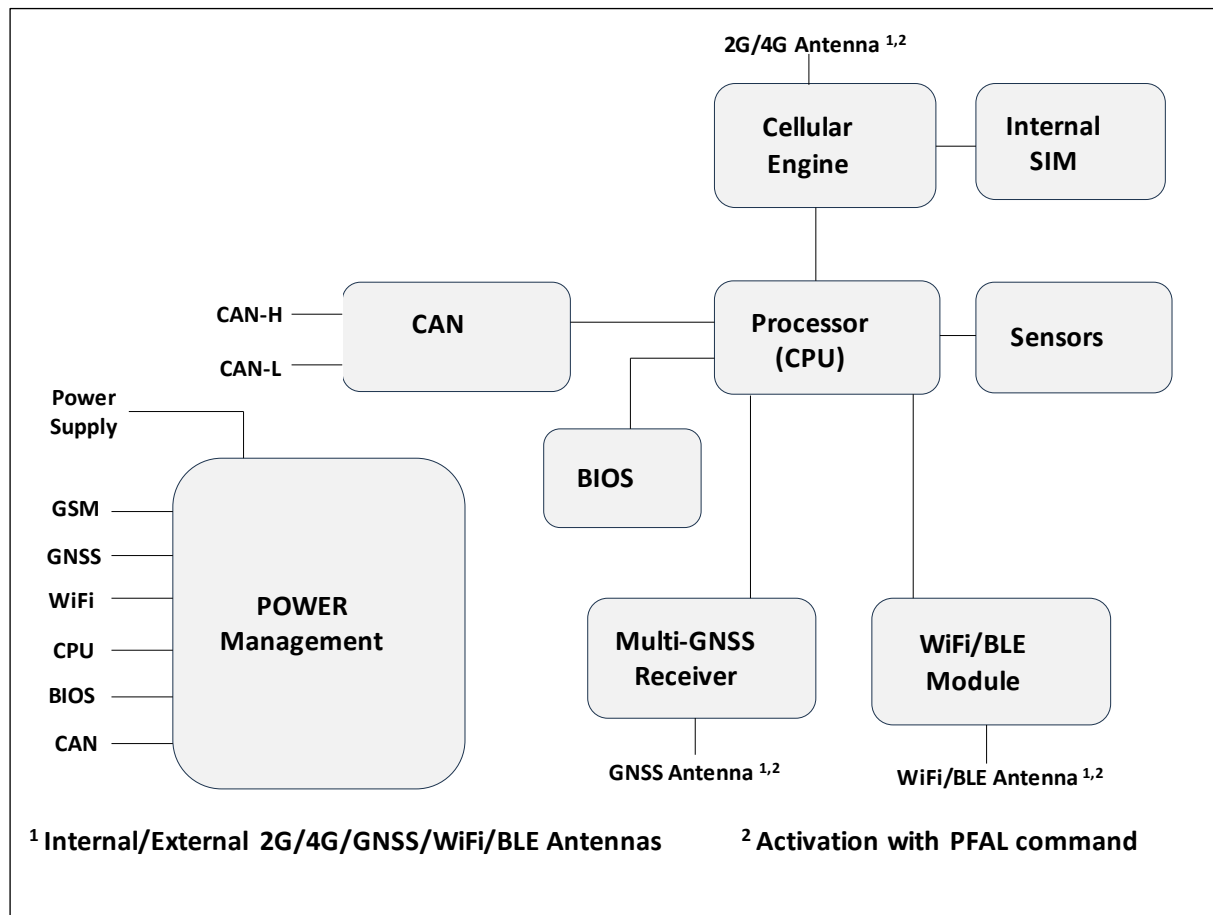


Figure 2: FOX4-4G Architecture Block Diagram

1.7 Related documents

The following tables list all the user documents and application notes related to FOX4-4G. For user documents, refer to www.lantronix.com/resources/documentation/. For application notes, refer to www.lantronix.com/resources/application-notes/.

User Documents:

NR	Document	Description
[1]	PFAL Command Reference	Contains the description of the internal firmware and the complete list of supported PFAL commands used to manage/administer different parts of an application built on the FOX4 series devices.
[2]	FOX4 Series Promotion Kit – User Guide	Contains information about the FOX4-4G Promotion Kit and instructions for customers to evaluate the product and all its functionality.

Table 3: User Documents

Application Notes:

NR	Document	Description
[3]	Application Note: Transform History Binary Data in NMEA format for AVL devices and STEPII, MAMBO/2	Contains instructions to decode history data that is transmitted from an AVL device via TCP connection.
[4]	Application Note: Remote Firmware Update with Workbench Software	Contains instructions to upgrade AVL devices to a new firmware version remotely via TCP (server-based application).
[5]	Application Note: In-Vehicle Installation Guidelines for FOX3-2G/3G/4G and Bolero40 Series	Provides all the necessary instructions to install your product properly and safely in a vehicle.
[6]	Application Note: Eco-Drive-GPS Premium-Features in AVL Firmware 2.11.0 and above Part Number	Contains information about the features of the GPS-ECO-DRIVE supported as PREMIUM-FEATURE in the firmware version avl_2.11.0 and above.
[7]	Application Note: ADAVNCED ENCRYPTION STANDARD (AES_TCP) PREMIUM FEATURE in AVL Firmware 2.10.0 and above	Contains information about the features of the AES_TCP (ADVANCED ENCRYPTION STANDARD) supported as PREMIUM-FEATURE in the firmware version avl_2.10.0 and above.
[8]	Application Note: Activation of Premium-Features for FOX3-2G/3G/4G and Bolero40 Series	Contains instructions to activate a PREMIUM-FEATURE on an AVL device.
[9]	Application Note: Communication of Passive RFID Reader and FOX3 Series via Serial Link	Contains instructions to connect and use an RFID-Reader to/with AVL devices.
[10]	Application Note: CAN Applications with AVL Devices	Contains instructions to connect AVL devices to a vehicle, and to configure and use the CAN-Bus features.
[11]	Application Note: How to collect FMS/J1939/OBD-II data with FOX3-2G/3G/4G Series	Contains instructions to connect AVL devices to a vehicle, and to configure and use the CAN-Bus/FMS/OBDII features.
[12]	Application Note: Firmware WebUpdate for FALCOM AVL devices	Contains instructions to upgrade an AVL device firmware remotely over the air.
[13]	Application Note: Connecting a bar code scanner to STEPIII, STEPIII, Bolero-LT or FOX device	Contains instructions to connect a bar code scanner to an AVL device and transmit the scanned data.
[14]	Application Note: AVL_Software_Update.pdf	Contains instructions to upgrade an AVL device firmware to a new version locally via serial port.
[15]	Application Note: Getting started with 1-Wire Devices	Contains instructions to use the 1-Wire interface on the FOX3-2G/3G/4G Series.
[16]	Application Note: Reading real-time data from digital tachograph with IOBOX-CAN and FOX3 series	Provides information to configure your FOX3 series devices in combination with the accessory box IOBOX-CAN/WLAN, to connect the IOBOX-CAN/WLAN to the D8 connector of the digital tachograph, to read real time data from this interface, and to transfer them to your platform server.
[17]	Application Note: How to use IOBOX-WLAN with a FOX3-3G/4G series device	Provides information to configure your FOX3-3G/4G series devices in combination with the accessory box IOBOX-WLAN, to connect the IOBOX-WLAN to your AP (access point) and send data over WLAN to your platform server.

Table 4: Application Notes

These PDF files are viewable and printable from Adobe Reader. If you do not have the Adobe Reader installed, you can download it from <http://www.adobe.com>.

2 Disclaimer

Disclaimer concerning any application the customer may develop with AVL devices:

1. Due to the large variety of supported applications with AVL devices, we are not able to test all such types of applications.
2. The customer is solely responsible for proper use of the products and for a long-term test of the developed applications.
3. All applications are highly influenced by environmental conditions, correct handling, installation, and device configuration/programming. We don't assume any responsibility for correct work of customer application and any results like damaging or losses on non-working.
4. We are not responsible for and disclaim all warranties with respect to third-party products, for any damages caused by use of the third-party products in any combination with our devices. We do not assure that third-party products in use with our products will operate technically trouble free.
5. We recommend performing a reasonable test of your application before deploying into the field. The test should be also performed on any modification of configuration/programming, firmware update or any other changes made on the connected devices or peripherals also before deploying the change into the field. The environmental conditions and the duration of these tests should reflect the conditions of the real use case/installation.

3 Security

This chapter contains important information for the safe and reliable use of the FOX4-4G devices. Please read this chapter carefully before using your device.

3.1 General information

Your FOX4-4G devices utilize the GSM/GNSS standard for cellular technology. GSM is a newer radio frequency (RF) technology than the current FM technology that has been used for radio communications for decades. The GSM standard has been established for use in the European community and elsewhere. Your FOX4-4G is a low power radio transmitter and receiver. They send out and receive radio frequency energy. When you use your modem, the cellular system handling your calls, controls both the radio frequency and the power level of your cellular modem.

SIM cards are required to use the devices. The SIM cards can be acquired from specific providers. Additional costs can result from the use of the SIM cards which are to be borne by the purchaser (client) of the devices. The seller does not cover the extra costs for the use of the devices. The seller gives no recommendation for the use of specific SIM cards and is not liable for the fact that the devices are usable with all available SIM cards. The seller is also not liable for any other costs incurred by the application of the customer in connection with this device.

3.2 Exposure to RF energy

There has been some public concern about possible health effects of using GSM modems. Although research on health effects from RF energy has focused for many years on the current RF technology, scientists have begun research regarding newer radio technologies, such as GSM. After existing research had been reviewed, and after compliance with all applicable safety standards had been tested, it has been concluded that the product is fit for use.

If you are concerned about exposure to RF energy, you can minimize exposure by limiting the duration of your calls and operating your cellular modem efficiently by following the guidelines in below topics.

3.3 Driving

Check the laws and regulations on the use of cellular devices in the area where you drive. Always obey them. Also, when using your FOX4-4G device while driving, please pay full attention to driving, pull off the road and park before making or answering a call if driving conditions so require. When applications are prepared for mobile use, they should fulfil road safety instructions of the current law.

3.4 Electronic devices

Most electronic equipment, for example in hospitals and motor vehicles is shielded from RF energy. However, RF energy may affect some malfunctioning or improperly shielded electronic equipment.

3.5 Vehicle electronic equipment

Check with your vehicle manufacturer's representative to determine if any on board electronic equipment is adequately shielded from RF energy.

3.6 Medical electronic equipment

Consult the manufacturer of any personal medical devices (such as pacemakers, hearing aids, etc.) to determine if they are adequately shielded from external RF energy.

Turn off your FOX4-4G devices in health care facilities when any regulations posted in the area instruct you to do so. Hospitals or health care facilities may be using RF monitoring equipment.

3.7 Aircraft

Turn off your FOX4-4G device before boarding any aircraft. Use them on the ground only with crew permission. Do not use them in the air.

To prevent possible interference with aircraft systems, Federal Aviation Administration (FAA) regulations require you to have permission from a crew member to use your modems while the plane is on the ground. To prevent interference with cellular systems, local RF regulations prohibit using your modems whilst airborne.

3.8 Children

Do not allow children to play with your FOX4-4G devices. Children could hurt themselves or others, damage the modems or make calls that increase your modem bills.

3.9 Blasting areas

To avoid interfering with blasting operations, turn your device off when in a blasting area or in areas posted: **Turn off two-way radio**. Construction crew often uses remote control RF devices to set off explosives.

3.10 Potentially explosive atmospheres

Turn off your FOX4-4G devices when in any area with a potentially explosive atmosphere. It is rare, but your modems or their accessories could generate sparks. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death. Areas with a potentially explosive atmosphere are often, but not always, clearly marked. They include fueling areas such as petrol stations, below decks on boat, fuel or chemical transfer or storage facilities etc., and areas where the air contains chemicals or particles such as grain, dust, or metal powders. Do not transport or store flammable gas, liquid, or explosives, in the compartment of your vehicle which contains your modem or accessories.

Before using your modems in a vehicle powered by liquefied petroleum gas (such as propane or butane) ensure that the vehicle complies with the relevant fire and safety regulations of the country in which the vehicle is to be used.

3.11 Safety for Li-ion batteries

Lithium-Ion (Li-Ion) batteries require particularly careful handling. This applies to charging and discharging techniques, storage, and other aspects of general handling. Mistreating the battery may cause the battery to get hot, crack, or inflame and cause serious injury. To avoid any damage and extend the life expectancy of battery, please follow the safety rules listed below while using FOX4-4G devices with the backup battery:

- Do not place the battery on, in or near fires, apparatus that provide heat, or other high temperature locations.
- Do not place the battery in direct sunshine, use or store the battery inside cars in hot weather. Doing so may cause the battery to generate heat, crack, or inflame. Using the battery in this manner may also result in a loss of performance.
- Do not attach the battery to a power supply plug or directly to a car's cigarette lighter.
- Do not pierce the battery with nails, strike the battery with a hammer, step on the battery, or otherwise subject it to strong impacts or shocks.
- Do not solder onto the battery contacts.
- Do not allow the battery to get wet.
- Do not disassemble or modify the battery.
- Immediately discontinue use of the battery if, while using, charging, or storing the battery, the battery emits an unusual smell, feels hot, or appears abnormal in any other way.
- Do not place the batteries in microwave ovens, high-pressure containers, or on induction cookware.

- In case the battery drips and the fluid get into one's eye, do not rub the eye. Rinse well with water and immediately look for medical care. If left untreated the battery fluid could cause damage to the eye.

3.11.1 Safety precautions while charging the battery

Be sure to follow the rules listed below while charging the battery. Failure to do so may cause the battery to become hot, rupture, or ignite and cause serious injury.

When charging the battery ensure that the specified battery charging conditions are met. The temperature range over which the battery can be charged is 10°C to 45°C. Charging is interrupted if the ambient temperature is outside of this range.

3.11.2 Safety precautions while discharging the battery

The temperature range over which the battery can be discharged is -10°C to 60°C. Use of the battery outside of this temperature range may damage the performance of the battery or may reduce its life expectancy.

3.11.3 Safety precautions when replacing the battery

Follow the below instructions while replacing the battery:

- The lithium battery must be handled correctly to avoid possible danger.
- Replace the battery only with the same battery that comes with the device.
- Use of another battery invalidates all warranty claims for the device.

Caution: Risk of explosion if battery is replaced by an incorrect type.

Dispose of the used battery as required by local ordinances or regulations.

3.12 Non-ionizing radiation

The FOX4-4G devices come with internal and external GSM/GNSS/Wi-Fi antennas. Therefore, care should be taken to install the devices/antennas in such a position that no part of the human body will normally rest within 20 cm of any part of the antennas for more than a few minutes whilst the equipment is in use. It is also recommended not to use the devices close to medical devices such as hearing aids and pacemakers.

4 Safety Standards

Your GSM/GNSS/Wi-Fi devices comply with all applicable RF safety standards.

FOX4-4G devices meet the safety standards for RF receivers, and the standards and recommendations for the protection of public exposure to RF electromagnetic energy established by government bodies and professional organizations such as Directives of the European Community, Directorate General V in matters of radio frequency electromagnetic energy.

5 Technical Data

5.1 Product features

Supply voltage range:

Operating power supply voltage range of +10.8 V to +60.0 V DC. Suitable for direct connection to an automotive with +12V or +24V DC power source (vehicle battery).

Power saving:

10 energy-saving modes, programmable with PFAL commands. See [chapter 6.1.3](#) for more details.

Operating temperature range:

-30°C to + 75°C (see [chapter 5.1.2](#) for more details).

Physical characteristics:

- Size: 83.0 ± 0.5 mm x 105 ± 0.5 mm x 28.0 ± 0.5 mm
- Weight (without battery): ca. 130 gram

Physical Interfaces:

- Main Port (8pin row connector) comprising:
 - ✓ 3 x I/Os (Each pin has dual functions, analog or digital, and is software configurable. Each digital pin can individually be set as input or output. IO1 is a versatile IO and can measure voltage or current. The function is controlled by PFAL command. IO2 and IO3 can only measure voltage.)
 - ✓ 1 x Ignition pin (software-controlled feature)
 - ✓ 1 x Power supply (software-controlled feature)
 - ✓ 1 x Serial port (Rx, Tx) (Baud rate is controlled by firmware and ranges from 4800...115200 bps with default value of 115200 bps, 8 data bits, no parity, 1 stop bit, and no flow control.)
- Accessory Port (6pin row connector) comprising:
 - ✓ 1-Wire line for connecting 1-Wire slave devices, such as iButton, temperature & humidity sensors etc.
 - ✓ I²C interface*
 - ✓ 1 x RS485 port*
 - ✓ 1 x Serial port (Rx, Tx) (Baud rate is controlled by firmware and ranges from 4800...115200 bps with default value of 115200 bps, 8 data bits, no parity, 1 stop bit, and no flow control.)

* Accessory port provides either I²C or RS485 function depending on the device SKU. Refer to section [1.1](#)
- 10pin mini-USB port comprising:
 - ✓ USB port
 - ✓ SPI interface
- Inside SIM card holder (supports 1.8/3 V SIM cards)
- Built-in 3D G-sensor for power management, motion, and shock alarm
- 3 x LED indicators (red, green, yellow) free-programmable
- External ports for connecting a GSM/GNSS/Wi-Fi antenna

Internal Antenna:

- GSM/GNSS/Wi-Fi Internal antennas with built-in auto switch
- Connect/Disconnect event generation

Internal memory:

- 16 MB FLASH for configuration, data-logging, and firmware storage
- 8 MB RAM

Casing:

Fully shielded

Air humidity:

5 % up to 95 % (non-condensing)

Firmware:

- Embedded TCP/IP stack, including TCP, IP, SMTP and UDP protocols
- Accessible via PFAL commands
- Upgradable locally via serial port and remotely over the air (OTA)

Supported Protocols:

- NMEA Msg: GLL, GGA, RMC, VTG, GSV, and GSA
- Own Msg: IOP, GSM, AREA, 3DP, and BIN

(See [1.7 Related documents](#) [1] and [Table 7](#))

Directive:

RoHS compliant (RoHS Directive 2002/95/EC)

5.1.1 Power consumption for FOX4-4G

CPU	Cellular	Cellular CAT	GNSS	Wifi	BLE	Current Consumption (mA)	Power Consumption (mW)
On	On	CAT1	Off	Off	Off	147	1764
					On	150	1800
				On	Off	158	1896
					On	163	1956
			On	Off	Off	156	1872
					On	159	1908
				On	Off	172	2064
					On	175	2100
	On	CATM1	Off	Off	Off	102	1224
					On	106	1272
				On	Off	116	1392
					On	120	1440
			On	Off	Off	114	1368
					On	117	1404
					Off	125	1500

				On	On	132	1584
	Off	CAT1	Off	Off	Off	120	1440
					On	122	1464
			On	Off	128	1536	
				On	125	1500	
			On	Off	123	1476	
				On	129	1548	
			On	Off	145	1740	
				On	154	1848	
	Off	CATM1	Off	Off	Off	75	900
					On	94	1128
			On	Off	100	1200	
				On	102	1224	
			On	Off	104	1248	
				On	108	1296	
			On	Off	118	1416	
				On	120	1440	

5.1.2 Operating temperatures

Parameter	Min.	Typ.	Max.	Unit
Storage temperature	-30	+25	+75	°C
Operating temperature	-30	+25	+75	°C
GSM*	-30	+25	+75	°C
Charging temperature (battery-operated **)	+10	+25	+45	°C
Discharging temperature (battery-operated **)	-10	+25	+60	°C
Highest specified charging temperature: 50±5 °C Lowest specified charging temperature: 5±5°C * The GSM/GPRS module is fully functional (-20 °C to + 55 °C meets the 3GPP specifications). ** Optional. Storage and using conditions of the device with battery option are limited to the battery temperature range.				

Table 5: Operating temperatures for FOX4-4G

5.1.3 Cellular engine features

The table below lists the FOX4-4G cellular engine features:

Device/Region	Supported frequencies				
	LTE		WCDMA	GSM/GPRS	
	Category	Bands	Bands	Slot class	Bands
FOX4-4G-M1-BLE					
Europe*	CAT M1	1/2/3/4/5/8/12/13/18/19/20/25/26/28/66/85	NA	10	2/3/5/8
North America	CAT M1	1/2/3/4/5/8/12/13/18/19/20/25/26/28/66/71/85	NA	NA	NA
Japan	CAT M1	1/2/3/4/5/8/12/13/18/19/20/25/26/28/66/71/85	NA	NA	NA
FOX4-4G-C1-BLE					
Europe*	CAT 1	1/3/7/8/20/28	1/8	12	3/8
ANZ, Latin America	CAT 1	2/4/5/12/13/25/26	1/2/5/8	12	2/3/5/8

Table 6: Cellular Engine Regions, Technologies, and Band Support for FOX4-4G

*These devices are compliant to GSM Phase 2/2+.

Output power:

- Class 4 (2 W) at EGSM900/850
- Class 1 (1 W) at GSM1800 and GSM 1900.
- Class 3 (23 dBm) at LTE

GPRS connectivity:

- GPRS multi-slot class 10 for CATM1 and multi-slot class 12 for CAT1
- GPRS mobile station class B.

DATA:

- LTE:
 - ✓ CAT1:
 - Downlink transfer: max. 10 Mbps
 - Uplink transfer: max. 5 Mbps
 - ✓ CATM1:
 - Downlink transfer: max. 300 Kbps
 - Uplink transfer: max. 375 Kbps
- GPRS:
 - ✓ Downlink transfer: max. 85.6 Kbps
 - ✓ Uplink transfer: max. 42.8 Kbps
 - ✓ Coding scheme: CS-1, CS-2, CS-3, and CS-4 (see [Table 15](#)).
- CSD: CSD transmission rates: 2.4, 4.8, 9.6, 14.4 Kbps, non-transparent, V.110.

SMS:

Text mode.

Ring tones:

Offers a choice of 19 different ringing tones/melodies, easily selectable with PFAL commands.

5.1.4 GNSS engine features

GNSS engine:

- Multi-channel GNSS (GPS/Galileo/GLONASS) receiver
- GPS L1 C/A code

Accuracy:

- Position: 2.5 m CEP
- SBAS: 2 m CEP

Time to First Fix (TTFF):

- Hot starts: 1 second
- Cold starts: 26 seconds

Sensitivity:

- Tracking: -161 dBm
- Cold start: -148 dBm.

Operational limits:

- Velocity: 500 m/s (972 knots)
- Altitude: 50,000 m
- Max. update rate: 1 Hz

A-GPS support:

AGPS: Online / Offline / Autonomous

Crystal oscillator (TCXO):

Load sensitivity: ± 10 % load change, $0.2 \pm$ ppm

5.1.5 Wi-Fi Module

WLAN Protocol:

802.11b/g/n

Wi-Fi Bands (GHz):

2.4

Security:

WPA2

Region:

Global

5.2 NMEA data message

FOX4-4G device deliver data in the NMEA-0183 format and own format. The table below lists the NMEA, and own supported protocols and gives a brief description for each of them. For further description about these protocols, refer to [1.7 Related documents](#) [1].

These protocols can be sent via SMS, TCP, data call, serial port, e-mail or stored inside the device using the corresponding PFAL Commands. For example, the PFAL command **PFAL,GSM.Send.TCP...** allows you to send protocols via TCP to a remote server. These protocols contain information such as current device location, GPS state, UTC time, date, speed, course over ground etc. This information can be used for graphical representation of the device location. Installing such a device in a vehicle, lets you know where your vehicle is, what is the status of your vehicle, whether your vehicle has been moved without authorization from a park area, real time updates regarding vehicle movement and more. The TCP server developed by Lantronix called Percepixon has features that allow you to monitor and manage your vehicle, fleet, and your assets.

NMEA	Description
GPGLGA	It contains GPS time, position, and fix type data.
GPGLLL	It contains GPS latitude, longitude, UTC time of position fix and status.
GPGLSA	It contains satellites used in the GPS position solution and DOP values.
GPVTG	It contains the number of GPS satellites in view, satellite ID numbers, elevation, azimuth, and SNR values.
GPGLSV	It contains the number of GPS satellites in view, satellite ID numbers, elevation, azimuth, and SNR values.
GPRMC	It contains GPS time, date, position, course, and speed data.
GLGSA	It contains the GNSS DOP, and Active Satellites (if GLONASS activated)
GLGLSV	It contains the GNSS satellites in view (if GLONASS activated).
OWN	Description
GPIOP	It contains the status of digital/analog input and output ports, and battery voltage (if battery used).
GPGLSM	It contains the GSM operator, reception, registration status, GSM field strength, area code and cell ID.
GPAREA	It contains the state (entered or left the area/geofence) of 32 areas and 100 geofences - such as territory management, route verification, prohibited locations, parking area and more.
GP3DP	It contains the state values of the motion sensor.
BIN	The user protocol contains GPS time, date, position, course, and speed data in binary format (small sized - only 21 characters).

Table 7: NMEA Output Messages

6 FOX4-4G Application Interface

6.1 Power supply

The power supply for the FOX4-4G devices must be a single voltage source of $V_{+IN} = +10.8 \text{ V} \dots +60.0 \text{ V}$ DC. The operating voltage (V_{+IN}) must be applied permanently to the FOX4-4G devices and provide sufficient current of up to **1.5 A** (pulse).

The operating voltage (V_{+IN} and GND) is protected against voltage spikes and reverse polarity, but **NOT** protected against continuous overvoltage.

NOTE: Operating voltage range must never be exceeded; care must be taken to fulfill min/max voltage requirements.

6.1.1 Power supply pins (1 and 2) on the 8-pin connector

One +IN pin on the main 8-pin port is dedicated to connecting the supply voltage, and the GND pin for grounding.

Both +IN and GND pins serve to charge the connected backup battery (optional), and to power the FOX4-4G devices. FOX4-4G has an automatic power ON-function when external power is applied and no battery connected. The power supply for the FOX4-4G ranges from $V_{+IN} = +10.8 \text{ V} \dots +60.0 \text{ V}$ DC allowing direct connection to vehicle power system.

Signal Name	I/O	Parameter	Description
+IN	I	+10.8 V... +60.0 V DC. The operating voltage must never exceed the above range.	Positive operating voltage. For security reason, it is recommended to protect the input voltage by an external 2A fuse between the device and DC power source (see Figure 8).
GND	-	0 V	Ground (Should be isolated from the vehicle grounds when the device is going to be installed in a vehicle.)

Table 8: Power Supply pins 1 and 2 on 8-pin connector

6.1.2 Automatic shutdown

Automatic shutdown takes effect if under voltage is detected (internal battery level runs below the nominal voltage and the external power supply is disconnected).

6.1.3 Power saving

SLEEP mode reduces the functionality of the modules of the FOX4-4G devices to a minimum and, thus, minimizes the current consumption to the lowest level. The FOX4-4G can be set into the sleep mode using the command **\$PFAL,Sys.Device.Sleep**[ChargeSleep,Doze] with one or more parameters listed in the table below. Following SLEEP modes are supported by the FOX4-4G devices:

Modes	Description
Example	<pre>\$PFAL,Sys.Device.Sleep=IGN+Ring+Timer=1:20:00 \$PFAL,Sys.Device.ChargeSleep=IGN \$PFAL,Sys.Device.Doze=Ign+Wakeup=23:20:00</pre>

Modes	Description
IGN	Device wakes up when a rising edge (Low to High signal) is detected on the IGN pin.
Ring	Device wakes up on incoming voice call or SMS.
Wakeup=15:30:00	Device wakes up at the set wake up time.
Timer=1:20:00	Device wakes up when timeout has expired.
Motion=200	Device wakes up when the set motion value is exceeded.
ExtPwrDetect	Device wakes up when external power connection is detected.
ExtPwrDrop	Device wakes up when external power disconnection is detected. For battery powered devices, the device wakes up when the battery voltage drops below the minimum.
GPS	Sets the GPS receiver into the Hibernate state
CAN*	Device wakes up when activities on the CAN bus interface are detected. This wakeup condition is supported only with \$PFAL,Sys.Device.Doze.
LowBat=3.6	Device wakes up when the battery voltage drops below the specified value.

Table 9: FOX4-4G Sleep Modes

IMPORTANT: The sleep and wake-up procedures are quite different depending on the selected sleep mode. Please note that the power saving with **Ring** works properly only when the PIN authentication has been done and the device is already registered in the GSM network. If you attempt to activate power saving while the device is not registered in the GSM network, the SIM card is not inserted or the PIN not correctly entered, the device responds with error **ring shutdown aborted due to bad GSM coverage** and the power saving does not take place.

Note: Related to the battery-powered devices only.

When activating any sleep mode, make sure that the internal battery has enough power to safely wake up the device from that sleep mode. If the internal battery does not have enough power, the device can not complete the wake-up process.

6.2 Determining the External Equipment Type

You need to determine if the external hardware serial ports are configured as DTE (Data Terminal Equipment) or DCE (Data Communications Equipment) before you connect the serial port pins of the FOX4-4G devices to an external equipment.

FOX4-4G devices are designed for use as DCE devices. Based on the conventions for DCE-DTE connections, it communicates with the customer application (DTE) using the following signals:

FOX4- 4G Terminal (DCE)	to	Application (DTE)
RxA	<-----	TXD
TxA	----->	RXD
GND	-	GND

Table 10: The signaling definitions between DTE and DCE

7 Hardware Interfaces

This chapter describes the hardware interfaces.

Interface specifications	
Main Port	The 8pin double-row connector, type: MOLEX-43045-08-MICRO FIT. It provides IN/OUT, power supply and first serial port (SER0) lines.
Accessory Port	The 6pin double-row connector, type: MOLEX-43045-06-MICRO FIT. It provides 1-Wire bus, I ² C master interface, second serial port (SER1) lines.
10pin-Mini-USB Port	10pin mini-USB port with SPI interface and USB - Master interface.
Optical LED Indicators	3 x LED indicators, free programmable using PFAL commands to show the device current state.
Mounting Holes	8 x mounting holes for attaching the device to a suitable location (use M4x20 self-tapping or machine screws for mounting, not included).
External Antenna Ports	FAKRA connectors for connecting GSM, GNSS and Wi-Fi antennas.
Battery tray	It is used to insert and connect the battery to the device.
SIM Holder	It is used to insert your SIM card into the device for using GSM/GPRS services.

Table 11: Interface specifications

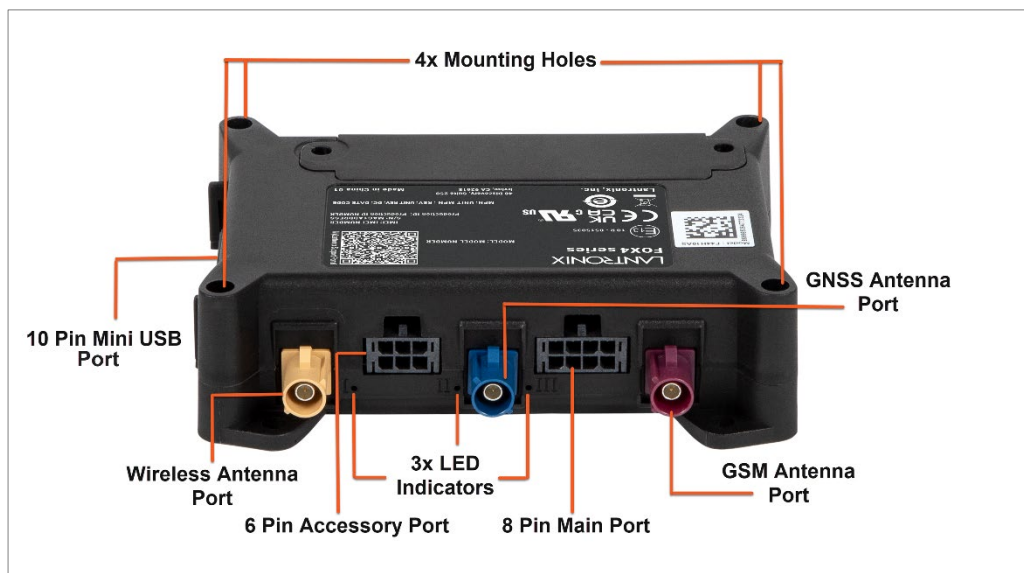


Figure 3: Interface specifications for FOX4-4G devices

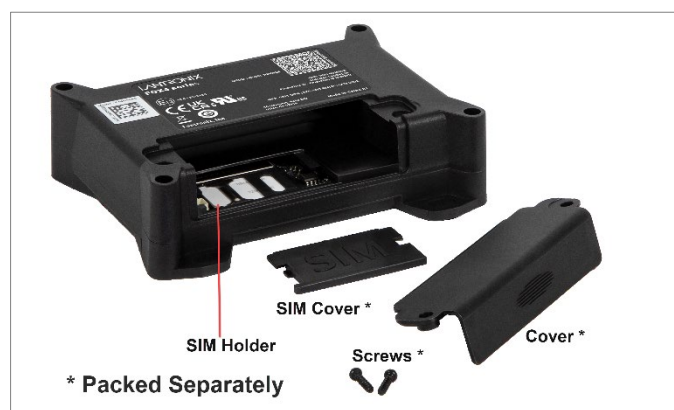


Figure 4: FOX4-4G SIM Holder

7.1 Main Port (8-pin)



Figure 5: Pin Assignment of 8-pin Main Port

7.1.1 Main Port Pinout

PIN	NAME	DIRECTION	DESCRIPTION	LEVEL
1	+IN	Input	Power supply input - The power supply should meet the requirements of current consumption. Care must be taken so that the operating voltage applied to the device, stays within the voltage range. Applying a voltage outside of the voltage range can damage the device. For security reasons, it is recommended to integrate externally a 2A fuse link between power source and FOX4-4G (see Figure 8).	$V_{+IN} = +10.8 \dots +60.0 \text{ V}$ $I_{max} \leq 1.5 \text{ A}$
2	GND	-	Ground.	0 V
3	IGN	Input	General purpose input - It can be either connected to the vehicle ignition and be used for journey START and STOP reports or connected to the operating voltage +IN to wake up the FOX4-4G devices from IGN-Sleep mode (awakening from this mode requires a HIGH signal). See chapter 7.1.2.4 .	HIGH $\geq +10.8 \dots +60.0 \text{ V DC}$; LOW = 0 V
4	I/O1	Input/Output	Software configurable pins - Each pin has dual functions as analog or digital. Each digital pin can individually be set either as input or output. Every time the device starts up, a level change occurs on the I/O2 and I/O3 pins. Only I/O1 does not change the level on device start up. Pins I/O2 and I/O3 support CAN communication if this interface is activated. The CAN-Bus interface can be activated using the corresponding PFAL command (see PFAL command set for more details). In this case the I/O2 = CAN_L and the I/O3 = CAN_H).	OUT: 100 mA max. @ +0 ... +60.0 V DC (open collector) IN: 0 V... +60.0 V DC (High & Low levels are free-programmable) Analog: Up to 60.0 V DC/10 bits resolution
5	I/O2			
6	I/O3			

7	RxA_0	Input	Serial Port 0 - The serial port (receive data) for direct connection to the host PC (for configuration and evaluation of firmware). If this pin is not used leave it open.	V24, ± 12 V
8	TxA_0	Output	Serial Port 0 - Serial port (transmit data) for direct connection to the host PC (for transmitting history data, output GPS protocols, and more). If not used leave it open.	

Table 12: Main Port Pinout

7.1.2 Special pin description (pins 4, 5, 6)

The I/O2 and I/O3 (pins 5 and 6) can also operate as CAN-Bus interface if CAN is activated on the FOX4-4G devices. For more details about the CAN interface refer to the following documents under section [1.7 Related documents](#)

- PFAL Command Reference
- Application Note: CAN Applications with AVL Devices
- Application Note: How to collect FMS/J1939/OBD-II data with FOX3-2G/3G/4G series

These pins have dual functions. They are controlled by the internal firmware of FOX4-4G. You must define whether to use them as analog or digital pins. The configured digital pins can be inputs or outputs while the analog pins can only be inputs.

Their function is controlled by the command **PFAL, IO0[1,2].Config**. For example, if you want to use I/O1 as an analog pin, and the I/O2 and I/O3 as digital, use the following commands, respectively:

\$PFAL,IO0.Config=AI,2,11	// 0 = I/O1; AI = analog; 2 and 11 = min. and max. voltages for Low and High events
\$PFAL,IO1.Config=DI,5,10	// 1= I/O2; DI = digital input; 5 and 10 = min. and max. voltages for Low and High events
\$PFAL,IO2.Config=DI,5,10	// 2= I/O3; DI = digital input; 5 and 10 = min. and max. voltages for Low and High events

If you want to use a digital pin, e.g. I/O2 or I/O3, as a digital output pin, use the following PFAL commands:

\$PFAL,IO4.Set=high	//4= I/O1; high = sets output to high
\$PFAL,IO5.Set=high	//5 = I/O2; high = sets output to high
\$PFAL,IO6.Set=cyclic,2000,1000	//6 = I/O3; cyclic = sets output to high for 2 seconds and low for 1 seconds.

When using an I/O as digital pin you must first set it to high (with PFAL command **\$PFAL,IO4.Set=high** or **\$PFAL,IO5.Set=high** or **\$PFAL,IO6.Set=high**), otherwise 0V will be measured and the device could get damaged.

Some examples of how to use them are provided in the sections below.

7.1.2.1 How to use I/O pins (4, 5, 6) as analog inputs

These pins can operate either as digital or analog inputs, however they should be configured and calibrated with PFAL commands for such purposes.

Analog voltages of up to 60.0 V with 10 bits resolution can be processed and remotely evaluated by a server application. A pull-up resistor to a constant input voltage allows for resistive transducers to ground, e.g., fuel sensor or thermistors.

To use these IOs as analog inputs, send the following command to the device.

```
$PFAL,IO0[1,2].Config=AI,2,11
```

where 0, 1 and 2 are indices corresponding to IO1 (pin 4), IO2 (pin 5), and IO3 (pin 6) respectively, while the values 2 and 11 are min. and max. voltages that will be used to generate Low and High events, respectively. Detailed information can be found in the PFAL Command Reference, refer to [1.7 Related Documents](#) [1].

Connection example 1 (for I/O1 and I/O2):

An analog input can be connected to a temperature sensor (NTC resistor for instance). In the diagram below a fixed resistor is used between input voltage and I/O2, and a variable resistor (Negative Temperature Coefficient whose resistance or capacitance decreases when temperature increases), between I/O2 and ground. It is possible to set a low temperature alarm and a high temperature alarm. Passage through these thresholds will trigger an alarm. We recommend using SMS or TCP as alarm type with GPIOP protocol. The SMS can be received on a mobile phone, modem, or any GSM device when changes are detected. The analog-to-digital converter (ADC) inside the unit has an input voltage range from 0 to 2.5 V. An application example is shown in **Figure 7** below:

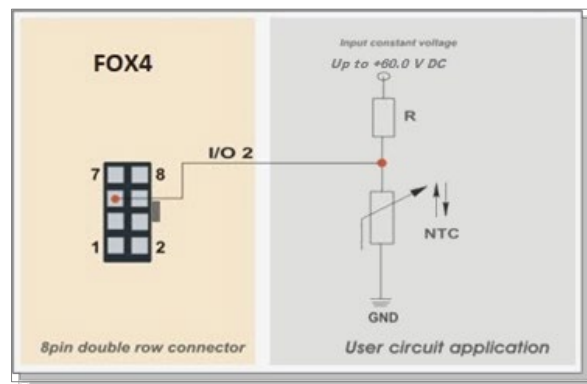


Figure 6: Connection example 1 when using it as analog input

Connection example 2 (for I/O1 and I/O2):

An analog input can be connected to a tachometer generator. The maximum output voltage of the tachometer should be +60.0 V (see example in figure below).

Both circuit examples (the NTC diagram above and the Tachometer below) are only illustrations to show the aim of these I/Os when using them as analog inputs.

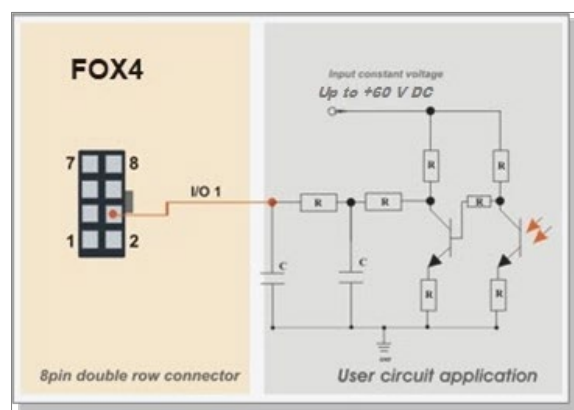


Figure 7: Connection example 2 when using it as analog input

7.1.2.2 How to use I/O pins (4, 5, 6) as digital Inputs

These pins are high active when used as digital inputs, so you can set $V_{IN(LOW)}$ and $V_{IN(HIGH)}$ to any levels within the range from +0 to +60.0 V DC. The High and Low levels can be set with PFAL command **PFAL,IO0[1,2].Config=DI,5,10** where 0, 1 and 2 are indices corresponding to IO1 (pin 4), IO2 (pin 5) and IO3 (pin 6) respectively. The values 5 and 10 are min. and max. voltages that will be used to generate Low and High events respectively. Detailed information about PFAL commands can be found in PFAL Command Reference, refer to [1.7 Related Documents](#) [1].

The figure below illustrates how these inputs can be used in practice. When the internal software detects input changes from High to Low or vice versa, a Falling or Rising edge Event is respectively generated. Therefore, depending on the alarm type, the FOX4-4G can react to the input changes and release different alarms such as sending out SMS, email messages, TCP packets, opening a CSD connection or activating output ports. The alarm type is configuration dependent.

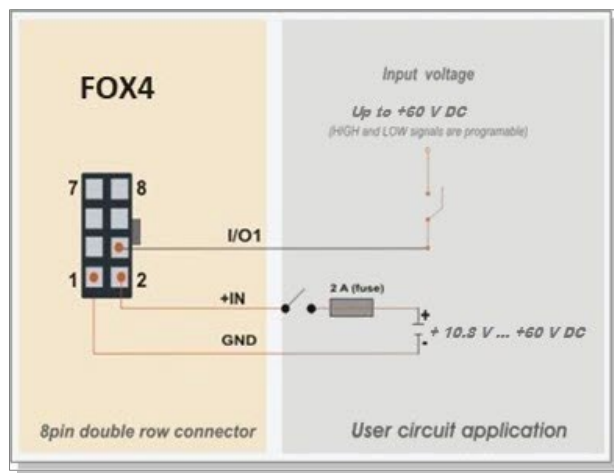


Figure 8: Connection example when using it as digital input

A completed circuit example for all inputs is provided in section [9.1.1](#).

7.1.2.3 How to use I/O pins (4, 5, 6) as digital outputs

FOX4-4G devices support three IOs which can be used either as input or output. These outputs are open collectors. They can be connected directly via resistors (R) to LEDs, Relays etc. and require power of 100 mA @ up to +60.0 V DC. The figures below show the schematic of possible output connections. To activate these outputs, use the command

\$PFAL,IO4[5,6].Set=high[low,hpulse,lpulse,cyclic] for **IO1**, **IO2** and **IO3** respectively or you can configure one or more alarms that activate these outputs when specific events occur (e.g., **\$PFAL,Cnf.Set,AL0=IO.e8=redge:IO4.Set=cyclic,1000,2000**).

To evaluate the alarm, send the alarm configuration to the FOX4-4G devices and then trigger IGN-pin to High. As a result, the IO1 goes High for 1 sec and Low for 2 sec. To set IO1 to Low, execute the command **PFAL, IO4.Set=Low**. For more details on how to activate an output and how to configure an alarm, refer to [1.7 Related documents](#) [1], PFAL Command Reference. Both figures below show the schematic connections of how to use this output.

NOTE: The power should not be applied directly to an output pin without having e.g., a resistor between them.

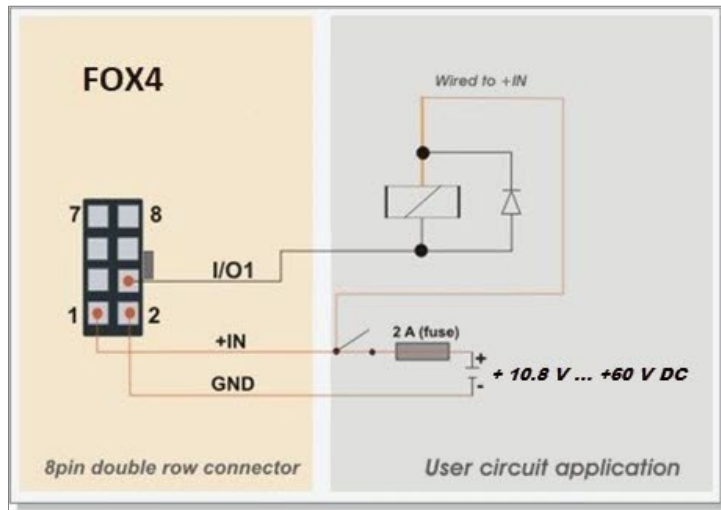


Figure 9: Connection example 1 when using it to control a Relay

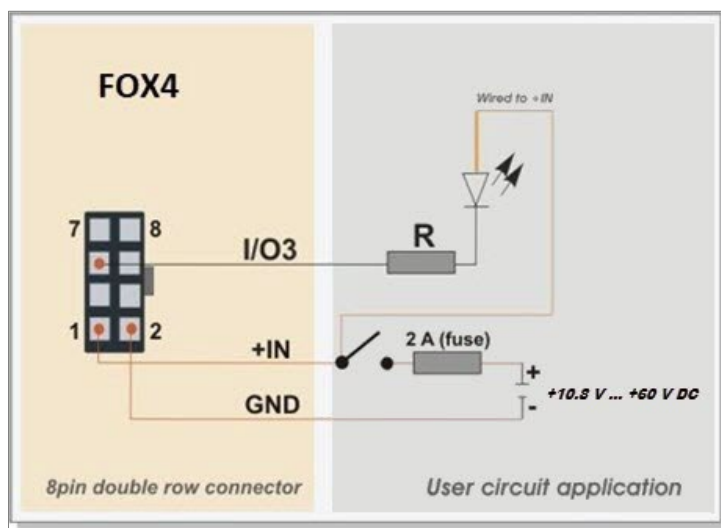


Figure 10: Connection example 2 when using it to control an LED

7.1.2.4 How to use IGN pin (pin 3)

It is strongly recommended to connect this pin to the ignition key to support the IGN-power saving function when the vehicle is off.

The IGN-pin has two functions:

- To wake up the FOX4-4G system from the IGN-sleep mode (when sleeping).
- To monitor the vehicle ignition state and report/store the trip START and STOP by using the events **IO.e8=redge** and **IO.e8=fedge** respectively.

IGN-sleep mode is one of the eight supported energy-saving modes of the device operation in which all unnecessary components are shut down. On IGN wake-up signal, the device returns to full functionality.

Note that, FOX4-4G devices power on automatically when external power is applied, and IGN pin provides an additional "wake up" function for the IGN-sleep mode when it is requested.

In case of unauthorized vehicle access/start, you are automatically alerted by SMS or TCP and the vehicle recovery can be started by knowing its exact location. In such a case, use the IGN generated event as a condition to start the vehicle tracking.

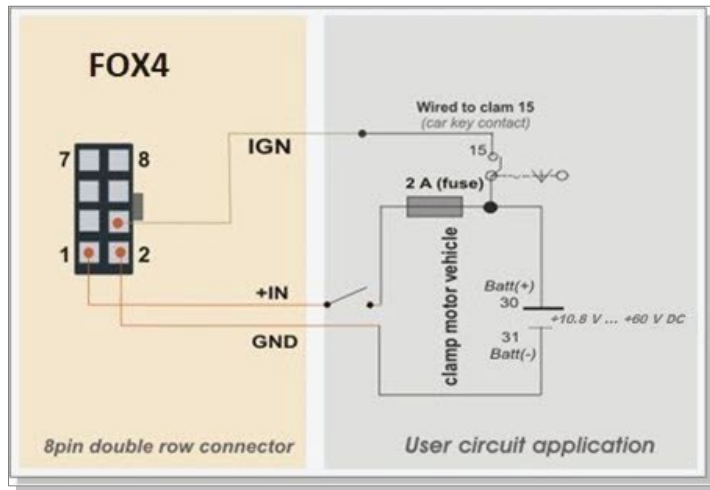


Figure 11: Monitoring vehicle starter by IGN line

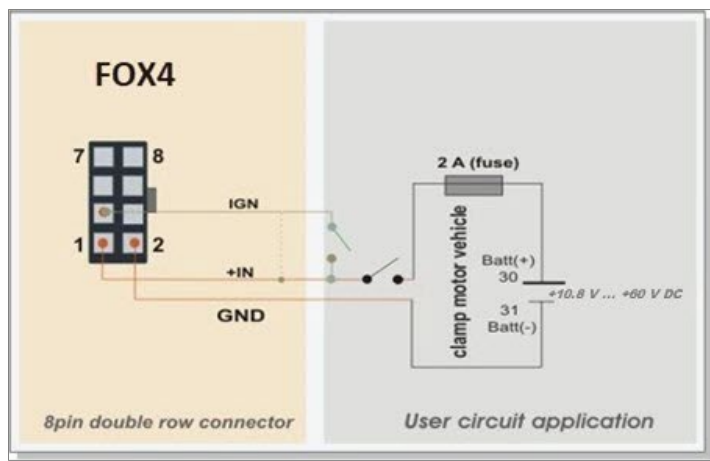


Figure 12: Use IGN line to wake FOX4-4G up from IGN-Sleep

7.1.2.5 Serial Port 0 - Serial communication signals (RxA and TxA)

FOX4-4G devices incorporate a full duplex serial channel which allows two devices to communicate directly with each other via the RS232 serial port. All supported variable baud rates are software controlled. It is recommended to use the FOX4-4G evaluation board to communicate with the FOX4-4G devices. The signals on these pins are obtained to RS232 compatible signal levels.

- **RxA_0** - Main channel used to receive software commands to the board from any software (e.g., HyperTerminal). Moreover, firmware update can also be done through this serial port.
- **TxA_0** - Main channel used to send navigation, measurement, response, and system data to any software (e.g., HyperTerminal, Workbench).

7.2 Accessory Port (6-pin)



Figure 13: Pin Assignment of 6-pin Accessory Port

7.2.1 Accessory Port Pinout

The function of the pins 5 and 6 varies depending on the device SKU. They either provide RS485 function or I2C function. Refer to section [1.1](#)

The table below lists the accessory port pinout for SKUs that provide RS485 communication:

PIN	NAME	DIRECTION	DESCRIPTION	LEVEL
1	1-Wire	Input /Output	1-Wire master interface - For Driver ID, temperature, and humidity sensors.	VOUT = + 2.8 .. +5.0 V Output = 3 mA max.
2	GND	-	Ground Reference.	0 V
3	RS232 (RxA_1)	Input	Serial Port 1 - Serial port (receive data) for direct connection to the host PC (configuration, evaluation, firmware). If not used leave it open.	-15 .. +15 V
4	RS232 (Tx_A_1)	Output	Serial Port 1 - Serial port (transmit data) for direct connection to the host PC (transmitting history data, GPS protocols and others). If not used leave it open.	-15 .. +15 V
5	RS485 (D-)	Input/Output	RS485 uses half-duplex communication. The direction is controlled with PFAL command.	-7 .. + 12 V
6	RS485 (D+)			

Table 13: Accessory Port Pinout for SKUs with RS485 function

The table below lists the accessory port pinout for SKUs that provide I2C communication:

PIN	NAME	DIRECTION	DESCRIPTION	LEVEL
1	1-Wire	Input /Output	1-Wire master interface - For Driver ID, temperature, and humidity sensors.	VOUT = + 2.8 .. +5.0 V Output = 3mA max.
2	GND	-	Ground Reference.	0 V
3	RS232 (RxA_1)	Input	Serial Port 1 - Serial port (receive data) for direct connection to the host PC (configuration, evaluation, firmware). If not used leave it open.	-15V .. +15V

4	RS232 (Tx_A_1)	Output	Serial Port 1 - Serial port (transmit data) for direct connection to the host PC (transmitting history data, GPS protocols and others). If not used leave it open.	-15 .. +15V
5	I2C (SCL)	Output	I2C bus interface (Serial Clock line) – The signal used to synchronize communication between the master and the slave.	
6	I2C (SDA)	Input /Output	I2C bus interface (Serial Data line) – The signal used to transfer data between the transmitter and the receiver.	

Table 14: Accessory Port Pinout for SKUs with I2C function

7.2.2 1-Wire interface description

A 1-Wire bus uses only one wire for signaling and power. One or several 1-Wire devices can be connected to the bus at the same time. Only one master should be connected to the bus.

Driver identification, temperature, and humidity sensors are quite often used on vehicle applications. The integration of 1-wire interface into the FOX4-4G devices, allows the system integrators for telematics, fleet management, and intelligent transportation system to be economical and time efficient in their work, due to the use of extra external devices which are not integrated into the in-vehicle computers. You can use the 1-Wire interface to know which drivers are in which vehicles and at the same time monitor the temperature and humidity of their refrigerated trucks. This allows shippers to use their server to record the transportation and delivery state of their temperature-sensitive loads.

How does it work?

A 1-Wire network consists of a master controller which is connected to one or many slave devices. The 1-Wire interface on FOX4-4G is a master controller. All the actual monitoring devices (lightning detector, moisture meter, motion detector, barometer, etc.) are slave devices. FOX4-4G communicate with temperature and iButton devices via 1-Wire protocol developed by Dallas Semiconductor, sending and receiving signals over a single data line plus ground reference. The 1-Wire protocol synchronizes the monitoring devices to the FOX4-4G, which initiates and requests all activities on the 1-Wire network. One key feature of the Dallas system is that every 1-Wire slave device has a guaranteed unique address saved on-chip ROM (Read Only Memory). This enables the master to recognize individually each of your slave devices and you can have multiple devices of the same type on the same network without conflict.

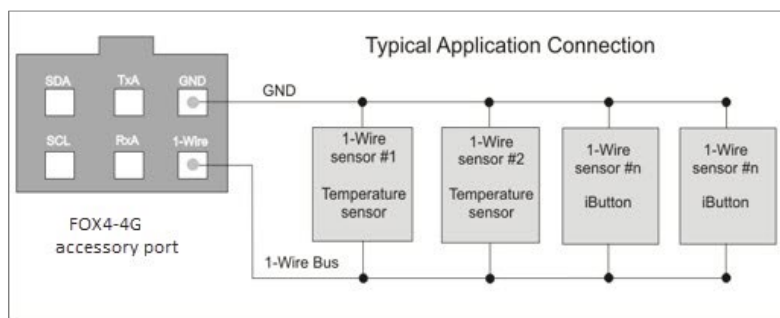


Figure 14: Typical application connection

1-Wire is a system of devices such as temperature, iButton etc. that are connected through the 1-Wire data line plus ground reference to the FOX4-4G devices. You can use and connect to the FOX4-4G 1-Wire line, only sensors that require power supply between 2.9 V and 5.0 V. FOX4-4G

devices receive on demand the unique address of the temperature and iButton IDs and other information they deliver. This information can then be sent via alarms to the remote TCP server.

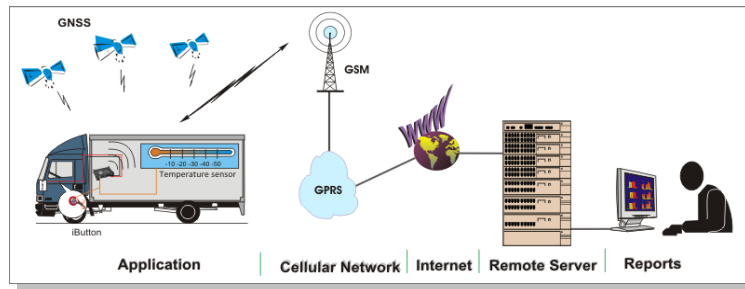


Figure 15: Typical application using 1-Wire single line

For more details about the 1-Wire interface, refer to [1.7 Related documents](#) [15] - Application Note: Getting started with 1-Wire Devices.

7.2.2.1 Serial Port 1 – Serial communication

The FOX4-4G accessory port provides the following types of serial communication:

- RS232
- RS485

The device supports either RS232 or RS485 communication at any given time. When RS232 mode is active, RS485 interface must remain open to avoid signal interference and vice versa.

Note: RS485 communication is available only for certain SKUs. Refer to section [1.1](#)

RS232

The FOX4-4G devices provides a full duplex serial channel in the accessory port which allows two devices to communicate directly via RS232 serial ports. Pin 3 - RS232 (Rx_A_1) and pin 4 - RS232 (Tx_A_1) are used for RS232 communication. All supported baud rates are controlled by PFAL commands. To communicate with the FOX4-4G devices, it is recommended to use the FOX4-4G Promotion Kit since it provides all the requirements you need for your evaluation. The signals on these pins are obtained to RS232 compatible signal levels.

- Rx_A_1 - Receive channel and can be used for executing commands and firmware update.
- Tx_A_1 - Output channel for responses and system data to any software (e.g., HyperTerminal, Workbench).

RS485

Pin 5 - RS485 (D-) and pin 6 - RS485 (D+) are used for RS485 communication. RS485 uses half-duplex communication. The direction is controlled with PFAL command.

7.3 Inserting SIM card into the SIM holder

FOX4-4G devices have a GSM modem that requires a SIM card to access the mobile network services. You have to purchase a SIM card from your mobile provider. You must activate it for GSM data services before using it. Together with the SIM card, you receive a 4-digit PIN number. Use this PIN to provide your device access the mobile network.

To insert the SIM card into the FOX4-4G SIM holder, follow the below steps:

1. Remove the power supply and any other connections from the device. Turn the FOX4-4G device on its back side as shown in [Figure 16](#) below.
2. Locate the SIM card holder to the left of the battery tray (1). To open it, push the metal slider in direction marked **OPEN**.
3. Flip the card holder up and Insert the SIM card into the card holder (2) in direction as shown in the figure below.
4. Flip the cardholder back (without force) (3), then hold it pressed and move the metal slider in direction marked **LOCK** until it stops.

5. Insert the SIM card cover in the direction as shown in picture below (4) and slide it until it stops (5).

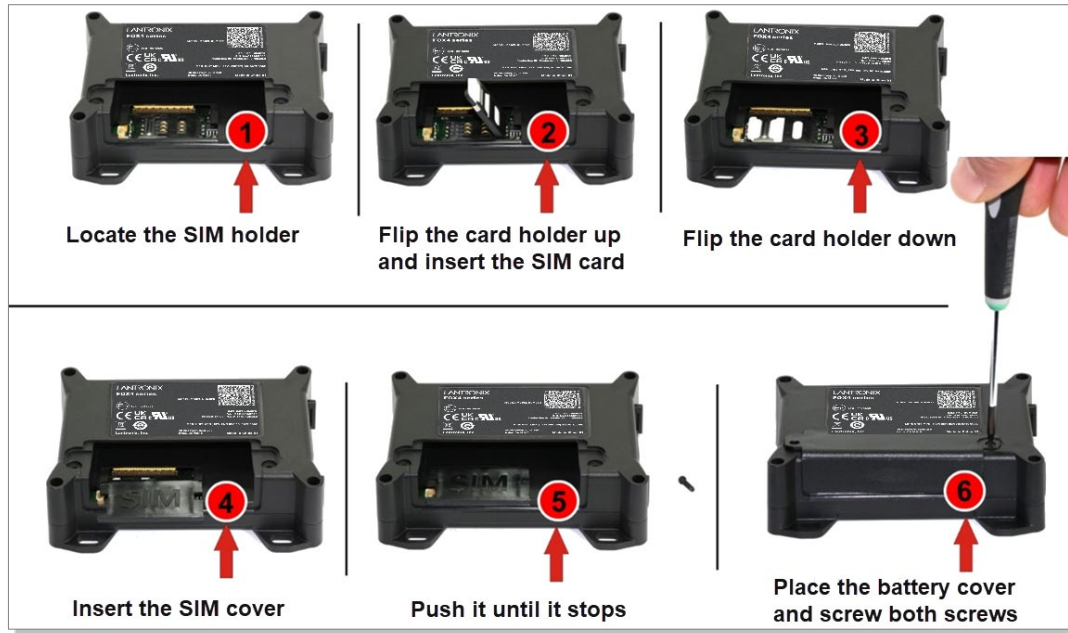


Figure 16: Steps for inserting the SIM card into FOX4-4G device

7.3.1 How to enter the PIN of the inserted SIM card

To enter the PIN of the SIM card, install Workbench application on your system. Use the Workbench application to establish connection with the device and execute the command to enter the PIN of the SIM card.

System requirements to install Workbench application:

- PC with Intel Core i3 or advanced processor and Windows 10/11, MacOSX, or Linux operating system installed.
- 512 MB of RAM or higher (512MB minimum supported; may limit performance and some features).
- 300 MB of available hard disk space (recommended 8 GB).
- Keyboard and Mouse.

To install and configure Workbench application on a system with Windows 10/11 operating system, do the following:

1. Go to <https://www.lantronix.com/products/workbench/> and download **lantronix-workbench-win-x64** zip file.
2. Extract the contents of the zip file.
3. Open the folder and double-click **start_workbench** file to launch Workbench.
4. The **Load Profile** dialog box displays, select **Default Empty** and click **OK**.
5. The Workbench UI displays (see **Figure 17** below).

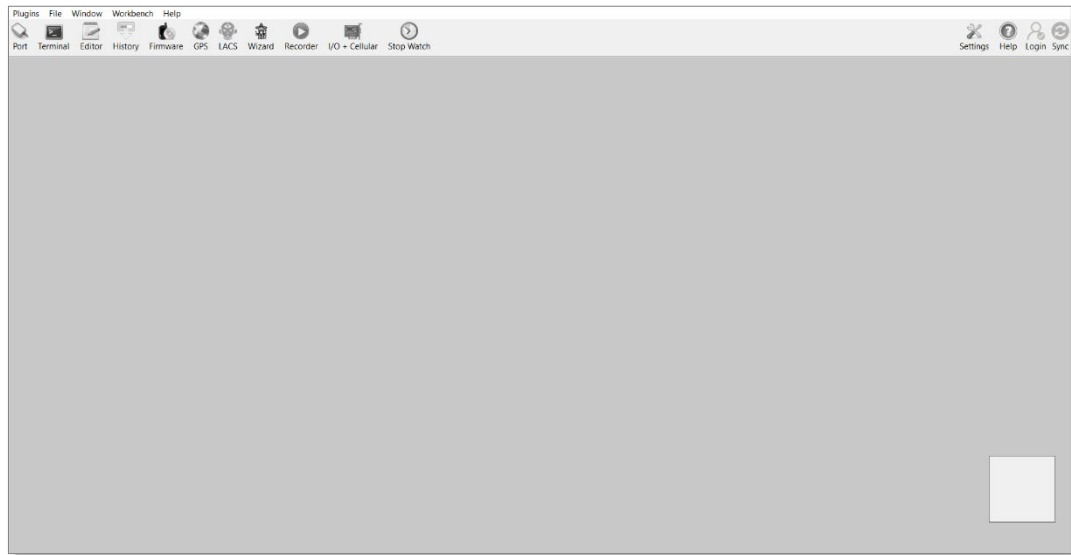


Figure 17: Workbench Interface

6. Connect your FOX4-4G device to a free PC COM port via its Promotion Kit and power up your device.
7. Click **Port** (1), to open a new Com port, **Portview 1** (2) displays (see **Figure 18 below**). In **Portview 1**, select the port to which the FOX4-4G device is connected (go to Device Manager > Ports > USB Serial Port (COMxx), where xx is the COM port to use). Select the following values for fields in **Portview 1**:
 - **Port type** – SERIAL
 - **Port** – select the port to which the theFOX4-4G device is connected (go to Device Manager > Ports > USB Serial Port (COMxx), where xx is the COM port to use)
 - **Baud** – 115200 bps
 - **Data bits** – 8
 - **Parity** – None
 - **Stop bit** – 1
 - **Flow Control** – None

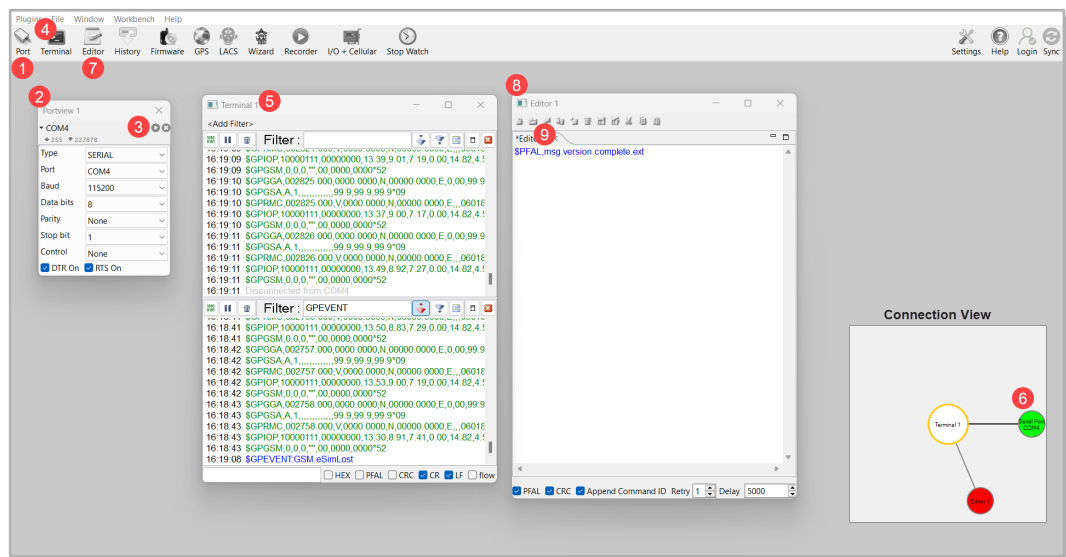


Figure 18: Workbench Interface Components

Finally, click **Play** icon (3) to open that COM port. Click **“Help”** button on the upper-right corner to get online help in HTML format.

8. Click **Terminal (4)** to open a new Terminal, **Terminal 1 (5)** displays. Click **Terminal 1** and go to **Connection View**. Right-click the **Connection View** window to enlarge it and click **COM port (6)** to establish connection between the COM port and Terminal. The COMPort icon turns green.
9. Click **Editor (7)** to open a new Editor, **Editor 1 (8)** displays. Click **Editor 1**, go to **Connection View** and Click **COM Port (6)** to establish connection between Editor and COM port. The COM port icon turns green.
10. To send commands to the FOX4-4G device, type them in the **Editor (8)** and then click **Start sending configuration (9)** or double click with left mouse on each configuration line in **Editor (8)** individually.
11. Type the command `$PFAL,Cnf.Set,GSM.PIN=xxxx` in the editor (xxxx=PIN of your SIM card) and send it to your device. For using GPRS and TCP services, refer to [1.7 Related documents](#) [1].

7.4 LED indicators

The actual state of the FOX4-4G can be displayed by three LEDs on the front panel of the unit. These programmable and accessible LEDs can be interfaced with the built-in components to show their state. For more information about customizing the device configuration refer to [1.7 Related Documents](#) [1] - PFAL Command Reference.



Figure 19: View of LED indicators

To turn on one of these LEDs, use the following commands:

```
$PFAL,IO11.Set=high           // 11=LED Yellow
$PFAL,IO12.Set=hpulse,2000    // 12=LED Green
$PFAL,IO13.Set=cyclic,2000,1000 // 13=LED Red
```

To turn off these LEDs, use the following command with corresponding index number:

```
$PFAL,IO[11,12,13].Set=low
```

7.5 10pin mini-USB port

This port supports a SPI and a USB 2.0 interface. The following table gives you an overview about the provided pins on this 10pin mini-USB port.

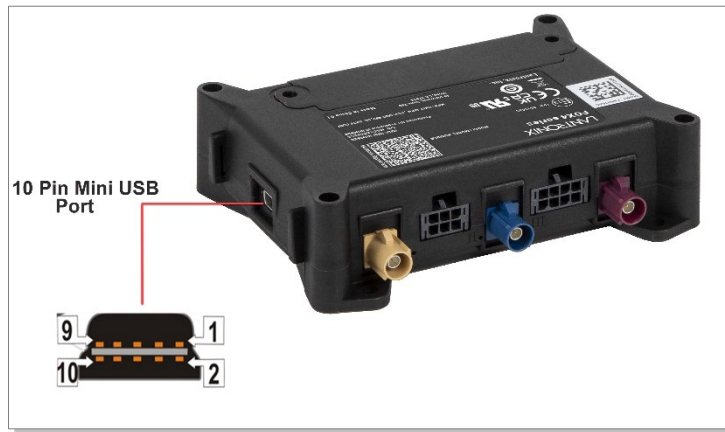


Figure 20: Pin assignment of the 10pin mini-USB port

PIN	NAME	DIRECTION	DESCRIPTION	LEVEL
1	MOSI	Output	Master output, slave input	
2	USB_V+	Input / Output	Power supply for IO-BOX	+ 3.6 ... + 5.25 V Output = 250 mA max.
3	MISO	Input	Master input, slave output	
4	DM	Input	USB Data -	Complies to the USB 2.0 specifications
5	CLK	Output	Serial clock	
6	DP	Output	USB Data +	Complies to the USB 2.0 specifications
7	Detect USB		Detects the connection to a USB master port.	
8	+IN	Input	=+IN (Pin 1 on 8pin connector)	Void
9	CS	Output	Chip select	
10	GND	-	Ground	

Table 15: Mini USB Port Pinout

The mini-USB port can be used to connect the FOX4-4G device to the IOBOX-MINI device, which is offered as an accessory.

7.6 Mounting

FOX4-4G offer different mounting possibilities, depending on the kind of antenna used.

- When installing a FOX4-4G with internal antennas, please make sure the FOX4-4G back side with the text **THIS SIDE TO SKY** is facing up to the sky, with no metal objects above or under the device case, that can interfere with GPS reception.
- When installing a FOX4-4G with external antennas, use the two connectors on the device for connecting a GSM/GNSS antenna such as ANT-14. During the installation, please make sure the receiving side of the GSM/GPS antenna is up, with no metal object above or under the antenna and device case, that can interfere with GPS reception.

Each of FOX4-4G provides 8 holes to be attached to suitable locations (see **Figure 24** below). It can be mounted in different directions and different locations such as on wall or in vehicle. Fasteners can be Hexagon head with collar self-drilling screws DIN 7504 K, ST3.5 x 32(12) mm and different length. There are no screws included in the delivery pack. For detailed information regarding the installation of the device in the vehicle, refer to [1.7 Related Documents](#) [5].

FOX4-4G are not waterproof or sealed devices. Care must be taken to ensure the devices are kept away from water or any other liquids.

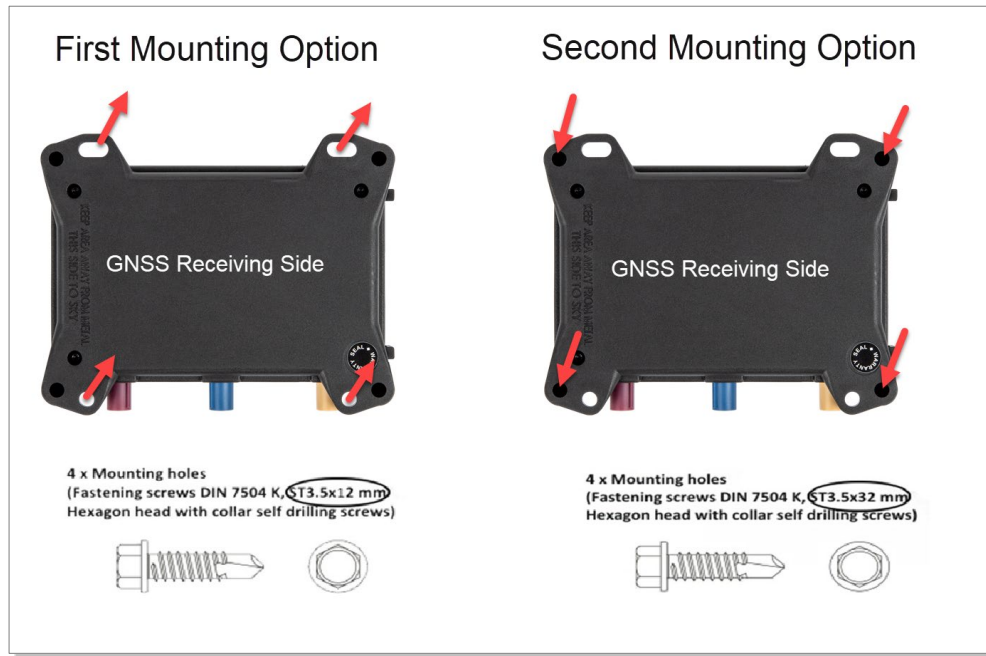


Figure 21: View of the mounting holes

7.7 External Antenna Ports

The unit comes with internal antennas and is also fitted with three external antenna connectors. External antennas may be used in applications where the unit is installed without a line-of-sight connection to external networks, such as inside a metal box.

The three male SMB FAKRA external antenna connectors accept a wide variety of GSM/GNSS/Wi-Fi antenna styles.

Note: The external antenna is not included in the standard delivery and must be ordered separately.

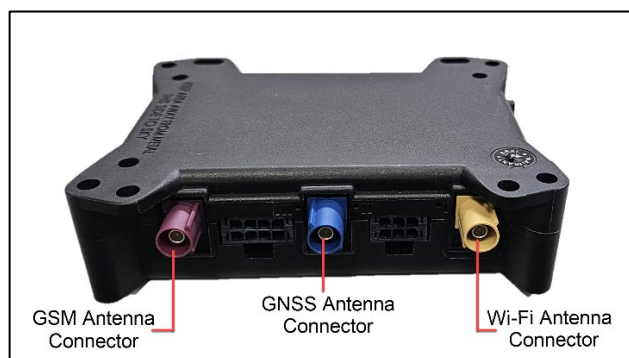


Figure 22: FOX4-4G GSM/GNSS/Wi-Fi Connectors

Lantronix offers a combined 2G/3G/4G cellular and GNSS antenna, part number 60168 for the FOX4-4G device (see **Figure 23** below).



Figure 23: Combined GSM/GNSS External Antenna, 60168



Figure 24: GSM/GNSS External antenna connected to FOX4-4G device

CAUTION: Be careful not to accidentally swap the GSM and GPS connectors. The device will not function if the antennas are swapped.

To comply with RF exposure requirements, install the antenna so that a distance minimum 20 cm can be maintained between the antenna and persons.

To connect the 60168 combined antenna to the FOX4-4G device:

- Plug the dark red colored connector of the antenna to the dark red colored connector of the device.
- Plug the blue colored connector of the antenna to the blue colored connector of the device.

To remove the 60168 antenna from the FOX4-4G device, press down the latches on the antenna connectors and then pull the antennas.

FOX4-4G device generates events when the external GNSS antenna is connected or disconnected.

Use PFAL commands to configure the device to automatically switch from internal to external GSM/GNSS antenna and vice versa depending on the events generated when the external GNSS

antenna is connected or disconnected. Refer to [1.7 Related Documents](#) [1] – PFAL Command Reference.

In the case of theft, if an intruder cuts off the GNSS antenna cable, an event is generated which can be used to trigger alarm notifications to the user.

8 Housing

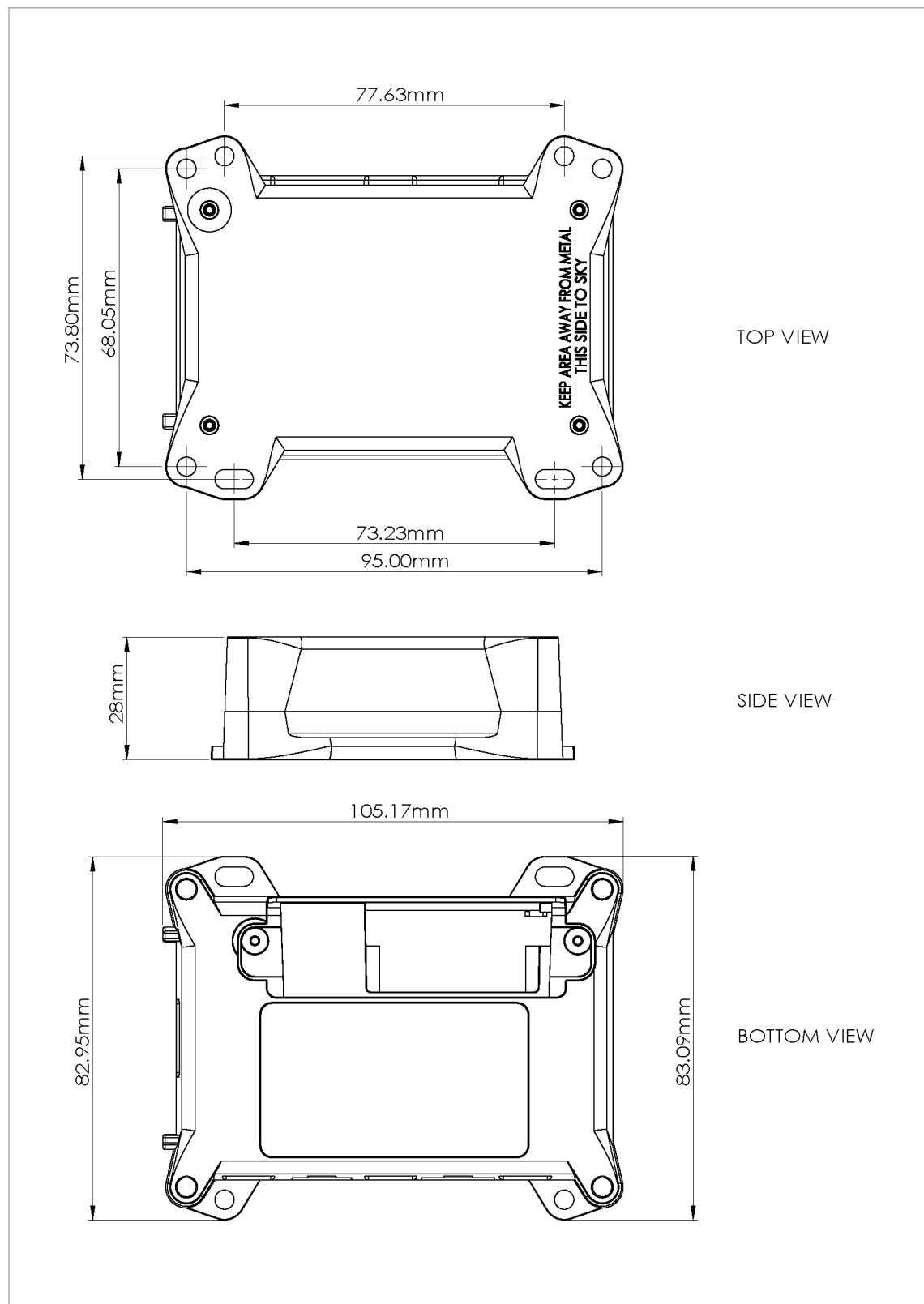


Figure 25: FOX4-4G housing

9 Appendix

9.1 Schematics

Figure 26 below illustrates a common schematic to install the FOX4-4G devices in the vehicle. For detailed information, refer to [1.7 Related Documents](#) [5].

9.1.1 Installation guidance

Upon installing the FOX4-4G in a vehicle, you will be able to track and locate the vehicle all the time and you will be automatically notified when disagreements with your stored configuration in the FOX4-4G device occur. Depending on the user requirements, the operator may program the digital outputs to activate something e.g., a relay, buzzer, turn on a lamp, etc. The digital inputs can be individually configured, for example, to detect something when it is opened or closed. Changes on digital inputs may trigger an output to activate, for example, a relay or buzzer. The IGN line can be connected to the vehicle ignition key to monitor its ON/OFF position.

Note: Turn the car ignition off before making any connection. Use a common ground point for all device ground pins. To avoid ground loops and second grounds, isolate all grounded pins of the FOX4-4G from the vehicle body. Do not connect power from a different system to the FOX4-4G.

The outputs of the FOX4-4G devices must be supplied with the same voltage applied to the (+IN) pin. The operating voltage MUST never exceed its range as the device is not protected against continuous overvoltage. For security reasons, it is recommended to integrate an external 2A fuse between the positive wire of the FOX4-4G (+IN) and D.C. power source.

You can mount the external antenna on the dash or on the windshield of the vehicle with the GPS side facing the sky. For security purposes, to prevent theft, it is advisable to mount the antenna under the dashboard.

Apply power to the FOX4-4G devices only with external antenna connected (if used) and vehicle ignition off. First connect the GND pin and finally apply power to the +IN pin of the FOX4-4G.

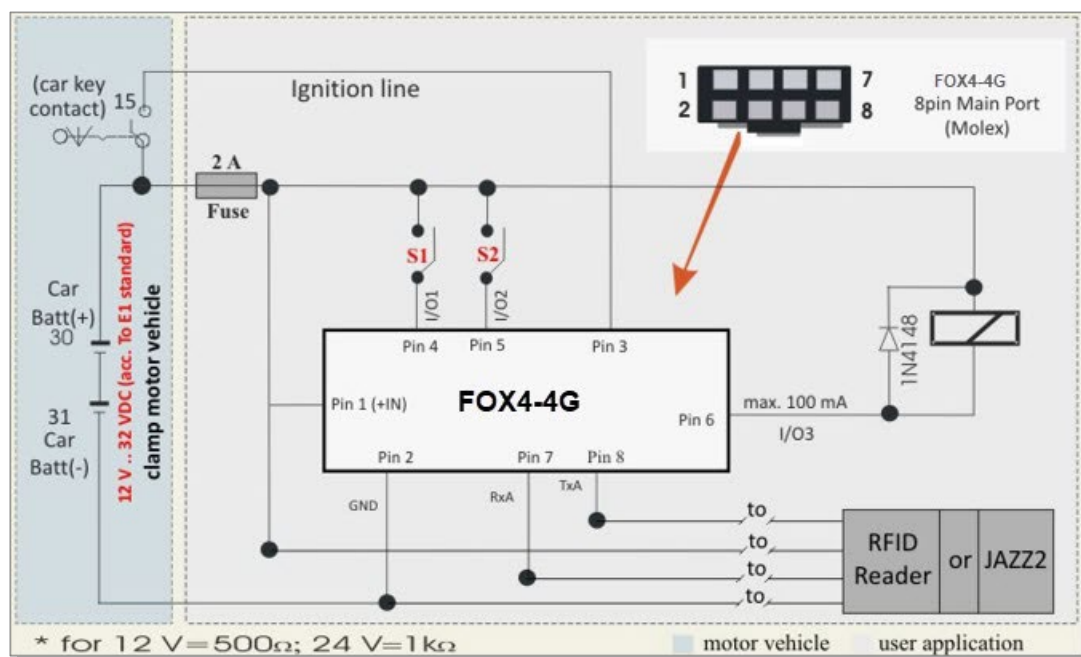


Figure 26: Schematic example of installation guidance

9.2 Considerations when using FOX4-4G device

FOX4-4G are devices controlled by means of the PFAL commands which are developed by us. These PFAL commands can be executed when the operating firmware inside the device is running. To create an application with the FOX4-4G devices and to obtain maximum benefit from the FOX4-4G operating firmware, you have to setup a specific configuration and store it in the

device. All PFAL commands can be sent to the FOX4-4G with the help of the Workbench software, which can be downloaded from our website. All PFAL commands supported by the FOX4-4G and other AVL devices are listed and described in the PFAL Command Reference. Refer to [1.7 Related Documents](#) [1].

9.3 GPRS coding scheme

Coding scheme	1 Time slot	2 Time slots	4 Time slots
CS-1:	9.05 kbps	18.1 kbps	36.2 kbps
CS-2:	13.4 kbps	26.8 kbps	53.6 kbps
CS-3:	15.6 kbps	31.2 kbps	62.4 kbps
CS-4:	21.4 kbps	42.8 kbps	85.6 kbps

Table 16: Coding schemes and maximum net data rates over air interface

Please note that the values listed above are the maximum ratings which, in practice are influenced by a great variety of factors, primarily, for example, traffic variations and network coverage.

9.4 Important Safety Information

This section describes the safety precautions that should be followed when installing and operating the unit in vehicle environments.

Follow the safety precautions listed below:

1. *The unit must be installed after a UL listed Fuse for Automobile use which complies with UL 275 (CCN FHXT) and rated 2 Amp. For example, COOPER BUSSMANN LLC model ATC-2.*
2. *All power wiring must be done with the supplied power cable and comply with intended applications of Society of Automotive Engineers (SAE J1292 or/and SAE J1939 or/and SAE J1128) specifications with suitable ratings of electrical, temperature exposure, and flammability.*
3. *The installation of the equipment to the vehicle power system should be done by a professional (Skilled Person), in accordance with SAE specifications.*
4. *Instructions caution the correct installation so as not to overload a particular vehicle system i.e., following vehicle information so you do not overload a particular circuit when adding an aftermarket device.*
5. *Install this unit in the car passenger compartment. Placement should not impede driver's view.*

10 Compliance

(According to ISO/IEC Guide and EN 45014)

Manufacturer's Name & Address:

Lantronix, Inc., 48 Discovery, Suite 250, Irvine, CA 92618 USA

Declares that the following product:

FOX4-4G

Conforms to the following standards or other normative documents:




Country	Specification
USA 	FCC 47 CFR part 15 Subpart B FCC 47 CFR part 15 Subpart 22H, 22E, 27 & 90S FCC 47 CFR Part 15 Subpart C
Canada	ISED RSS-130 Issue 2 RSS-132 Issue 3 RSS-133 Issue 6 RSS 139 Issue 3 RSS-247 Issue 2 RSS-GEN Issue 5
EU 	EU Declaration of Conformity See Figure Figure27
UK 	UK Declaration of Conformity See Figure Figure28
Safety	UL/EN 62368-1
Cellular Certification	PTCRB, AT&T

Table 17: Regional Certifications

Country	Specification
USA FCC ID	FOX4-4G-M1-BLE Cellular Module: R68FOX4M1BLE Wi-Fi Module: XMR202207FC909A FOX4-4G-C1-BLE Cellular Module: XMR202008EG91NAXD Wi-Fi Module: XMR202207FC909A
Canada IC ID	FOX4-4G-M1-BLE Cellular Module: 3867A-FOX4M1BLE Wi-Fi Module: 10224A-202207FC909A FOX4-4G-C1-BLE Cellular Module: 10224A-021EG91NAXD Wi-Fi Module: 10224A-202207FC909A

Table 18: Country Transmitter IDs

10.1 Federal Communications Commission (FCC) Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

This device has been tested and found to comply with the limits for a Class B digital pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy.

If not installed and used in accordance with the instructions, may cause harmful interference to radio communications. 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 to 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 to 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.

10.1.1 FCC Caution

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

10.2 FCC RF Exposure statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. To avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

This device contains 850/900/1800/1900 MHz GSM/GPRS functions, 850/900/1700/1900/ 2100 MHz UMTS functions and is operational in these frequencies respectively. Following frequency bands are not operational (must not be used) in U.S. Territories.

- GSM: 900/1800 MHz
- UMTS: 2100/1700 MHz

10.3 ISED Notice

This device complies with Innovation, Science and Economic Development Canada license exempt RSS standard(s). Operation is subject to the following two conditions:

- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR Innovation, Sciences et Développement économique 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

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

10.4 ISED RF Exposure Information

This device complies with ISED radiation exposure limits set forth for an uncontrolled environment. To avoid the possibility of exceeding the ISED radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.


Cet appareil est conforme aux limites d'exposition aux rayonnements de la ISED CNR-102 définies pour un environnement non contrôlé. Afin d'éviter la possibilité de dépasser les limites d'exposition aux fréquences radio de la ISED CNR-102, la proximité humaine à l'antenne ne doit pas être inférieure à 20 cm (8 pouces) pendant le fonctionnement normal.

10.5 IMDA Certification



Figure 27 IMDA Certification

10.6 EU Declaration of Conformity





EU DECLARATION OF CONFORMITY

Manufacturer's Name: LANTRONIX INC.
Manufacturer's Address: 48 Discovery, Suite 250, Irvine, CA 92618 US
Model Number: FOX4-4G-M1-BLE, FOX4-4G-C1-BLE

Manufacturer's Quality System:



ISO 9001:2015 Certificate No. 74 300 4282 TÜV Rheinland

Applicable EU Directives:

Low Voltage Directive (2014/35/EU)

- EN IEC 62368-1:2020+A11:2020

EMC Directive (2014/30/EU)

- EN55032: 2015 + A11: 2020
- EN55035: 2017 + A11: 2020

RF Radio Directive (2014 / 53 / EU)

- EN 301 489-1 V2.2.3
- EN 301 489-17 V3.2.4
- EN 301 489-19 V2.2.1
- EN 301 489-52 V1.2.1
- EN 300 328 V2.2.2
- EN 303 413 V1.2.1
- EN 62311:2008
- EN 301 511 V12.5.1
- EN 301 908-1 V15.1.1

EU Directive 2011/65/EU for Restriction of Hazardous Substance (RoHS2) with exemption 7(c)-I

- EN IEC 63000:2018

Statement of Conformity: The product specified above complies with applicable EU directive referenced, including the application of sound engineering practice.

Signature: *Eric Bass* Date: 21 March 2024
 Name: Eric Bass Title: VP of Engineering

Figure 28: EU Declaration of Conformity

10.7 EU Statements

Code	Language	Statement
bg	Bulgarian	<p>Lantronix, Inc., декларира, че този FOX4-4G device отговаря на основните изисквания и други приложими разпоредби на Директива 2014/53/EU.</p> <p>Пълният текст на декларацията на ЕС за съответствие е достъпен на следния интернет адрес: https://www.lantronix.com/products/fox-series/</p> <p>Известие на ЕС за ограничения при употреба: Това устройство е ограничено само за вътрешна употреба. Може да не се работи наоткрито.</p>
cs	Česky [Czech]	<p>Lantronix, Inc. tímto prohlašuje, že tento FOX4-4G device je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/EU.</p> <p>Úplné znění ES prohlášení o shodě je k dispozici na této internetové adrese: https://www.lantronix.com/products/fox-series/</p> <p>Oznámení EU o omezení používání: Toto zařízení je omezeno pouze na použití uvnitř. Nesmí být provozován venku.</p>
da	Dansk [Danish]	<p>Undertegnede Lantronix, Inc. erklærer herved, at følgende udstyr FOX4-4G device overholder de væsentlige krav og øvrige relevante krav i direktiv 2014/53/EU.</p> <p>Den fulde tekst til EU-overensstemmelseserklæringen er tilgængelig på følgende internetadresse: https://www.lantronix.com/products/fox-series/</p> <p>EU-meddelelse om begrænsninger i brug: Denne enhed er kun begrænset til indendørs brug. Det betjenes måske ikke udendørs.</p>

Code	Language	Statement
de	Deutsch [German]	<p>Hiermit erklärt Lantronix, Inc., dass sich das Gerät FOX4-4G device in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 2014/53/EU befindet.</p> <p>Der vollständige Text der EU-Konformitätserklärung ist unter folgender Internetadresse abrufbar: https://www.lantronix.com/products/fox-series/</p> <p>EU-Hinweis zu Nutzungsbeschränkungen: Dieses Gerät darf nur in Innenräumen verwendet werden. Es darf nicht im Freien betrieben werden.</p>
et	Eesti [Estonian]	<p>Käesolevaga kinnitab Lantronix, Inc. seadme FOX4-4G device vastavust direktiivi 2014/53/EU põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.</p> <p>EL-i vastavusdeklaratsiooni täielik tekst on saadaval järgmisel Interneti-aadressil: https://www.lantronix.com/products/fox-series/</p> <p>EL-i teade kasutuspiirangute kohta: seda seadet saab kasutada ainult siseruumides. Seda ei tohi õues kasutada.</p>
en	English	<p>Hereby, Lantronix, Inc., declares that this FOX4-4G device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.</p> <p>The full text of the EU declaration of conformity is available at the following internet address: https://www.lantronix.com/products/fox-series/</p> <p>EU Notice of Restrictions on Use: This device is limited to indoor use only. It may not be operated outdoors.</p>
es	Español [Spanish]	<p>Por medio de la presente Lantronix, Inc. declara que el FOX4-4G device module cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 2014/53/EU.</p> <p>El texto completo de la declaración de conformidad de la UE está disponible en la siguiente dirección de Internet: https://www.lantronix.com/products/fox-series/</p> <p>Aviso de restricciones de uso de la UE: este dispositivo está limitado solo para uso en interiores. No puede ser operado al aire libre.</p>

Code	Language	Statement
el	Ελληνική [Greek]	<p>ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Lantronix, Inc. ΔΗΛΩΝΕΙ ΟΤΙ FOX4-4G device ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 2014/53/EU.</p> <p>Το πλήρες κείμενο της δήλωσης συμμόρφωσης της ΕΕ διατίθεται στην ακόλουθη διεύθυνση διαδικτύου: https://www.lantronix.com/products/fox-series/</p> <p>Ειδοποίηση της ΕΕ για περιορισμούς χρήσης: Η συσκευή αυτή περιορίζεται μόνο σε εσωτερικούς χώρους χρήσης. Μπορεί να μην λειτουργεί σε εξωτερικούς χώρους.</p>
fr	Français [French]	<p>Par la présente Lantronix, Inc. déclare que l'appareil FOX4-4G device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 2014/53/EU.</p> <p>Le texte complet de la déclaration de conformité UE est disponible à l'adresse Internet suivante: https://www.lantronix.com/products/fox-series/</p> <p>Avis de restrictions d'utilisation de l'UE: Cet appareil est limité à une utilisation en intérieur uniquement. Il ne doit pas être utilisé à l'extérieur</p>
is	Icelandic	<p>Hér með lýsir Lantronix, Inc. því yfir að FOX4-4G device sé í samræmi við grunnkröfur og önnur viðeigandi ákvæði tilskipunar 2014/53 / ESB.</p> <p>Í heildartexta ESB-samræmisýfirlýsingarinnar er að finna á eftirfarandi internetfangi: https://www.lantronix.com/products/fox-series/</p> <p>Tilkynning ESB um takmarkanir á notkun: Þetta tæki er eingöngutakmarkað við notkun innanhúss. Það má ekki nota það úti.</p>
it	Italiano [Italian]	<p>Con la presente Lantronix, Inc. dichiara che questo FOX4-4G device è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 2014/53/EU.</p> <p>Il testo completo della dichiarazione di conformità UE è disponibile al seguente indirizzo Internet: https://www.lantronix.com/products/fox-series/</p> <p>Avviso di restrizioni d'uso dell'UE: questo dispositivo è limitato esclusivamente all'uso in interni. Potrebbe non essere utilizzato all'aperto.</p>


Code	Language	Statement
lv	Latviski [Latvian]	<p>Ar šo Lantronix, Inc. deklarē, ka FOX4-4G device atbilst Direktīvas 2014/53/EU būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.</p> <p>Pilns ES atbilstības deklarācijas teksts ir pieejams šādā tīmekļa vietnē: https://www.lantronix.com/products/fox-series/</p> <p>ES paziņojums par lietošanas ierobežojumiem: šo ierīci var izmantot tikai iekšējās. To nedrīkst darbināt ārpus telpām.</p>
lt	Lietuvių [Lithuanian]	<p>Šiuo Lantronix, Inc. deklaruoja, kad šis FOX4-4G device atitinka esminius reikalavimus ir kitas 2014/53/EU Direktyvos nuostatas.</p> <p>Visą ES atitikties deklaracijos tekstą galite rasti šiuo interneto adresu: https://www.lantronix.com/products/fox-series/</p> <p>ES pranešimas apie naudojimo apribojimus: Šis prietaisas skirtas naudoti tik patalpose. Jo negalima naudoti lauke.</p>
nl	Nederlands [Dutch]	<p>Hierbij verklaart Lantronix, Inc. dat het toestel FOX4-4G device overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 2014/53/EU.</p> <p>De volledige tekst van de EU-conformiteitsverklaring is beschikbaar op het volgende internetadres: https://www.lantronix.com/products/fox-series/</p> <p>EU kennisgeving van gebruiksbepalingen: dit apparaat is beperkt tot gebruik binnenshuis. Het mag niet buitenshuis worden gebruikt.</p>
mt	Malti [Maltese]	<p>Hawnhekk, Lantronix, Inc., jiddikjara li dan FOX4-4G device jikkonforma mal'htigijiet essenzjali u ma provvedimenti oħrajn rilevanti li hemm fid-Direttiva 2014/53/EU.</p> <p>It-test s'hih tad-dikjarazzjoni ta' konformità tal-UE huwa disponibbli flindirizz tal-internet li ġej: https://www.lantronix.com/products/fox-series/</p> <p>Avviż tal-UE dwar Restrizzjonijiet fuq l-Użu: Dan l-apparat huwa limitat għal użu ġewwa biss. Ma jistax jiġihaddem barra.</p>
hu	Magyar [Hungarian]	<p>Alulírott, Lantronix, Inc. nyilatkozom, hogy a FOX4-4G device megfelel a vonatkozó alapvető követelményeknek és az 2014/53/EU irányelv egyéb előírásainak.</p> <p>Az EU-megfelelőségi nyilatkozat teljes szövege a következő internetes címen érhető el: https://www.lantronix.com/products/fox-series/</p> <p>EU értesítés a korlátozásokról: Ez az eszköz csak beltéri használatra korlátozódik. Lehet, hogy szabadban nem üzemeltethető.</p>


Code	Language	Statement
no	Norwegian	<p>Lantronix, Inc. erklærer herved at denne FOX4-4G device er i samsvar med de grunnleggende kravene og andre relevante bestemmelser i direktiv 2014/53 / EU.</p> <p>Den fullstendige teksten til EU-samsvarserklæringen er tilgjengelig på følgende internettadresse: https://www.lantronix.com/products/fox-series/</p> <p>EUs merknad om bruksbegrensninger: Denne enheten er bare begrenset til innendørs bruk. Det kan hende at den ikke brukes utendørs.</p>
pl	Polski [Polish]	<p>Niniejszym Lantronix, Inc. oświadcza, że FOX4-4G device jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/53/EU.</p> <p>Pełny tekst deklaracji zgodności EU jest dostępny pod następującym adresem internetowym: https://www.lantronix.com/products/fox-series/</p> <p>Zawiadomienie UE o ograniczeniach użytkowania: To urządzenie jest przeznaczone wyłącznie do użytku w pomieszczeniach. Nie można go obsługiwać na zewnątrz.</p>
pt	Português [Portuguese]	<p>Lantronix, Inc. declara que este FOX4-4G device está conforme com os requisitos essenciais e outras disposições da Directiva 2014/53/EU.</p> <p>O texto completo da declaração UE de conformidade está disponível no seguinte endereço na Internet: https://www.lantronix.com/products/fox-series/</p> <p>Aviso da UE de restrições de uso: Este dispositivo está limitado apenas ao uso interno. Não pode ser operado ao ar livre.</p>
ro	Romanian	<p>Prin prezenta, Lantronix, Inc., declară că acest FOX4-4G device respect cerințele esențiale și alte dispoziții relevante din Directiva 2014/53 / UE.</p> <p>Textul complet al declarației de conformitate a UE este disponibil la următoarea adresă de internet: https://www.lantronix.com/products/fox-series/</p> <p>Notificarea UE privind restricțiile de utilizare: Acest dispozitiv este limitat numai la uz interior. Este posibil să nu funcționeze în aer liber.</p>
sr	Serbian	<p>Овиме, Лантроник, Инц., изјављује да је овај FOX4-4G device у складу са суштинским захтевима и осталим релевантним одредбама Директиве 2014/53 / ЕУ.</p> <p>Комплетан текст ЕУ изјаве о усаглашености доступан је на следећој Интернет адреси: https://www.lantronix.com/products/fox-series/</p> <p>Обавештење ЕУ о ограничењима употребе: Овај уређај је ограничен само на унутрашњу употребу. Можда се не користи на отвореном.</p>
Code	Language	Statement

sl	Slovensko [Slovenian]	<p>Lantronix, Inc. izjavlja, da je ta FOX4-4G device v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 2014/53/EU.</p> <p>Celotno besedilo izjave EU o skladnosti je na voljo na naslednjem spletnem naslovu: https://www.lantronix.com/products/fox-series/</p> <p>Obvestilo EU o omejitvah uporabe: Ta naprava je omejena samo na notranjo uporabo. Morda ga ne uporabljate na prostem.</p>
sk	Slovensky [Slovak]	<p>Lantronix, Inc. týmto vyhlasuje, že FOX4-4G device enterprise Wi-Fi IoT module spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 2014/53/EU.</p> <p>Úplné znenie EÚ vyhlásenia o zhode je k dispozícii na tejto internetovej adrese: https://www.lantronix.com/products/fox-series/</p> <p>Oznámenie EÚ o obmedzeniach pri používaní: Toto zariadenie je obmedzené iba na použitie v interiéri. Nesmie sa používať vonku.</p>
fi	Suomi [Finnish]	<p>Lantronix, Inc. vakuuttaa täten että FOX4-4G device tyyppinen laite on direktiivin 2014/53/EU oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.</p> <p>EU-vaatimustenmukaisuusvakuutuksen koko teksti on saatavana seuraavassa Internet-osoitteessa: https://www.lantronix.com/products/fox-series/</p> <p>EU: n ilmoitus käyttörajoituksista: Tämä laite on rajoitettu vain sisäkäyttöön. Sitä ei saa käyttää ulkona.</p>
sv	Svenska [Swedish]	<p>Härmed intygar Lantronix, Inc. att denna FOX4-4G device står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 2014/53/EU.</p> <p>Den fullständiga texten till EU-försäkran om överensstämmelse finns på följande internetadress: https://www.lantronix.com/products/fox-series/</p> <p>EU-meddelande om begränsningar för användning: Den här enheten är endast begränsad till inomhusbruk. Det får inte användas utomhus.</p>

Table 19: EU Statements

10.8 UK Declaration of Conformity






UK DECLARATION OF CONFORMITY

Manufacturer's Name: LANTRONIX INC.
Manufacturer's Address: 48 Discovery, Suite 250, Irvine, CA 92618 USA
Model Number: FOX4-4G-M1-BLE, FOX4-4G-C1-BLE

Manufacturer's Quality System:



ISO 9001:2015 Certificate No. 74 300 4282 TÜV Rheinland

Electrical Equipment Regulations 2016

- EN IEC 62368-1:2020+A11:2020

Electromagnetic Compatibility Regulations 2016

- EN55032: 2015 + A11: 2020
- EN55035: 2017 + A11: 2020

Radio Equipment Regulations 2017

- EN 301 489-1 V2.2.3
- EN 301 489-17 V3.2.4
- EN 301 489-19 V2.2.1
- EN 301 489-52 V1.2.1
- EN 300 328 V2.2.2
- EN 303 413 V1.2.1
- EN 62311:2008
- EN 301 511 V12.5.1
- EN 301 908-1 V15.1.1

UK SI 2012 No. 3032 for Restriction of Hazardous Substance (RoHS2) with exemption 7(c)-I and 6(c).

- 1) 2011/65/EU Restriction of the use of Hazardous Substances in EEE (RoHS)
- 2) 2015/863/EU Change of Annex II from 2011/65/EU
- 3) Directive 2018/736/EU[7(c)-I] and 2018/741/EU[6(c)]

BS EN IEC 63000 : 2018

Statement of Conformity: The product specified above meets the test requirements of the relevant legislation of United Kingdom, including the application of sound engineering practice.

Signature: Eric Bass Date: 21 March 2024
 Name: Eric Bass Title: VP of Engineering

Figure 29: UK Declaration of Conformity