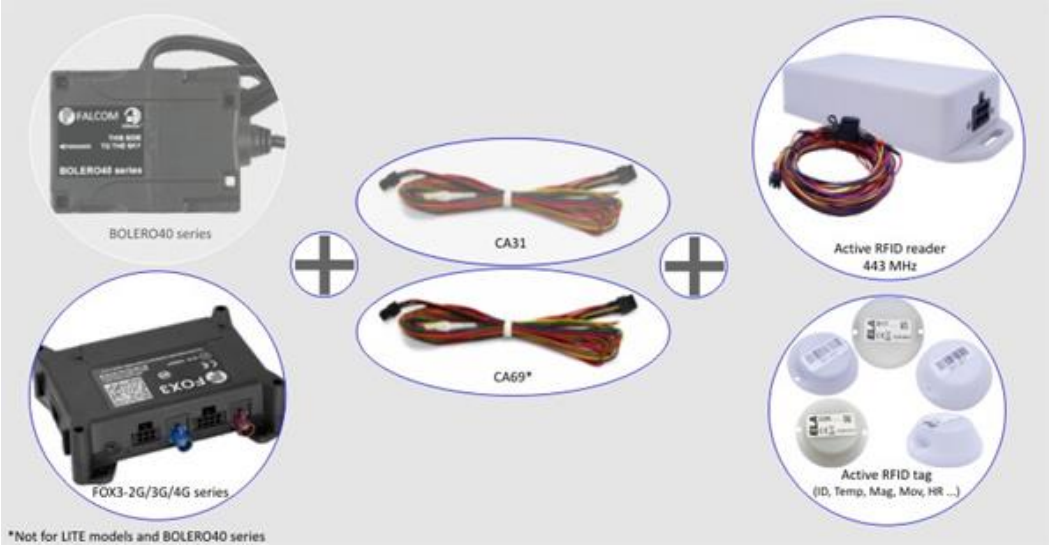
Application Note

How to integrate an ELA Active Reader into FOX3 & FOX3-3G Series for tracking skip and roll-off containers and other assets



Part Number APP-0028
Revision A November 2019

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Contacts

Lantronix, Inc.
7535 Irvine Center Drive, Suite 100
Irvine, CA 92618, USA
Toll Free: 800-526-8766
Phone: 949-453-3990
Fax: 949-453-3995

Technical Support
Online: www.lantronix.com/support

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Revision History

Date	Rev.	Comments
October 2015	1.0.0	Initial version.
November 2015	1.0.1	Added some pictures of ELA active RFID readers and active RFID Tags
February 2016	1.0.2	Added new configuration for using Magnetic and Temperature sensors
September 2016	1.0.3	Added new configuration for using COIN RH and PUCK ID sensors Added chapter 1.8
September 2016	1.0.4	Figure 2 updated.
June 2017	1.0.5	PFAL,Cnf.Set,DEVICE.COMM.BINEVENT=5B,5D,i changed to PFAL,Cnf.Set,DEVICE.COMM.BINEVENT1=5B,5D,I when connecting the ELA reader to the 2nd serial port of FOX3-2G/3G/4G (on 6pin connector).
December 2018	1.0.6	Added BOLERO40 series as new products supporting connection to ELA's RFID readers.
November 2019	A	Initial Lantronix document. Added Lantronix document part number, logo, contact information, and links.

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

Table of Contents

1 ABOUT THIS DOCUMENT

The aim of this application note is to describe, evaluate and integrate the ELA RFID reader to the Lantronix FOX3-2G/3G/4G and BOLERO40 series in order to improve transportation, distribution, asset tracking and management as well as logistics businesses.

1.1 Contact Information

Location Name	Contacts	
Lantronix support	Web :	http://www.lantronix.com/support
ELA support	Web : Online form:	http://www.rfid-ela.eu/active-rfid-readers.html http://www.rfid-ela.eu/contact-us.html

Table 1: Contact information

1.2 Introduction

Radio Frequency Identification (RFID), is a method of communicating using radio waves. Radio waves can communicate between active RFID tags, attached to objects for tracking purpose and automatic identification, and an RFID reader without requiring line-of-sight visibility. Active RFID tags can be read remotely over a range of distance up to 100 meters or more allowing keep track of valuable assets, monitor their movement and locate them quickly. This allows a highly defined reading area when tags go in and out of the interrogation zone and thereby a great flexibility in applications such as asset protection and supervision.

The mobile controlled RFID system consists of a FOX3-2G/3G/4G, connection cables, web server, active reader and tags.

Tags	Assets, goods and other objects to be tracked are fitted with active RFID tags. Active tags have transmitters and use batteries to send their information every pre-programmed interval to the reader. Such tags can contain sensors to monitor conditions such as identifications, temperature, humidity and other product- related information.
Reader	The RFID reader is connected via serial interface to the FOX3/-3G device. The reader receives all information transmitted from tags and sends them through the serial interface to the FOX3/-3G.
FOX3-2G/3G/4G	The FOX3-2G/3G/4G or BOLERO40 series is configured to react to data received on that serial port and to forward this data to the central tracking server via TCP.
Web Server	The client server/phone receives automatically information from the FOX3/-3G device to know when one tag or more arrive in or leave from the reader operating area.

Table 2: Required components for asset tracking with active RFID

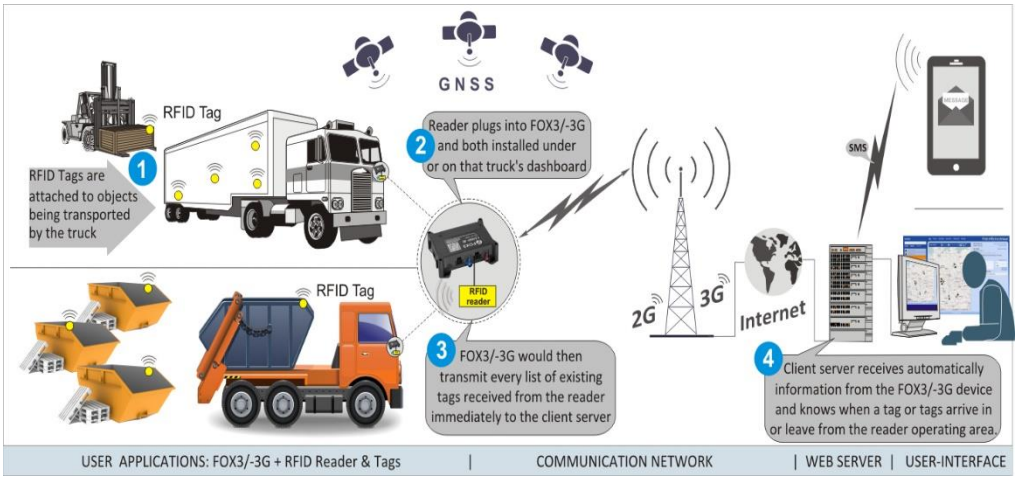

Figure 1: Typical application example using FOX3-2G/3G/4G or BOLERO40 with ELA reader and active tags

ELA Innovation offers a wide range of miniaturized active RFID readers and active RFID Tags, featuring ultra-low power consumption (ULPW) and extended battery life that meet the requirements of numerous applications. Use the following links for more information about ELA' active RFID reader and active RFID Tags.

 **COIN MOV**: http://www.rfid-ela.eu/coin-mov-.html	 **PUCK ID**: http://www.rfid-ela.eu/puck-id.html
 **COIN ID**: http://www.rfid-ela.eu/coin-id.html	 **COIN RH**: http://www.rfid-ela.eu/coin-rh.html
 **COIN MAG**: http://www.rfid-ela.eu/coin-mag.html	 **COIN T**: http://www.rfid-ela.eu/coin-t.html
 **SCIEL READER lite**: http://www.rfid-ela.eu/sciel-reader-lite.html	 **FLATY RFID antenna for Telematics applications**: http://www.rfid-ela.eu/flaty.html

Table 3: Overview of ELA active RFID readers and tags

1.3 Typical applications

- Inventory Management
- Skip and Roll-off Container Tracking
- Construction equipment activity
- Pallet and Construction Tool Tracking
- Remote Monitoring
- Asset Management
- Car Tracking in Rental

2 INSTALLING RFID READER TO FOX3-2G/3G/4G

The ELA RFID reader should be ordered by ELA with internal jumper set to 10-26VDC and not 5VDC. To install the ELA reader to the FOX3-2G/3G/4G use either CA31 which connects to 8pin main port or CA69 to 6pin accessory port. BOLERO40 series supports only the cable CA31 but not the CA69. Both cables have a 4pin connector consisting of an RS-232 interface (RX, XT) and power (+IN, GND) pins. At the end of both cables there are also the power supply lines that need to be connected to an external power source ranging from +12 to +32 VDC (e.g. 12 VDC). To connect the ELA reader with the FOX3-2G/3G/4G or BOLERO40 series, use your own 4pin female dual row connector and mount it on the opened end of the cable supplied with your reader. This counterpart connector with part number "662004113322" can be ordered from a third party distributor.

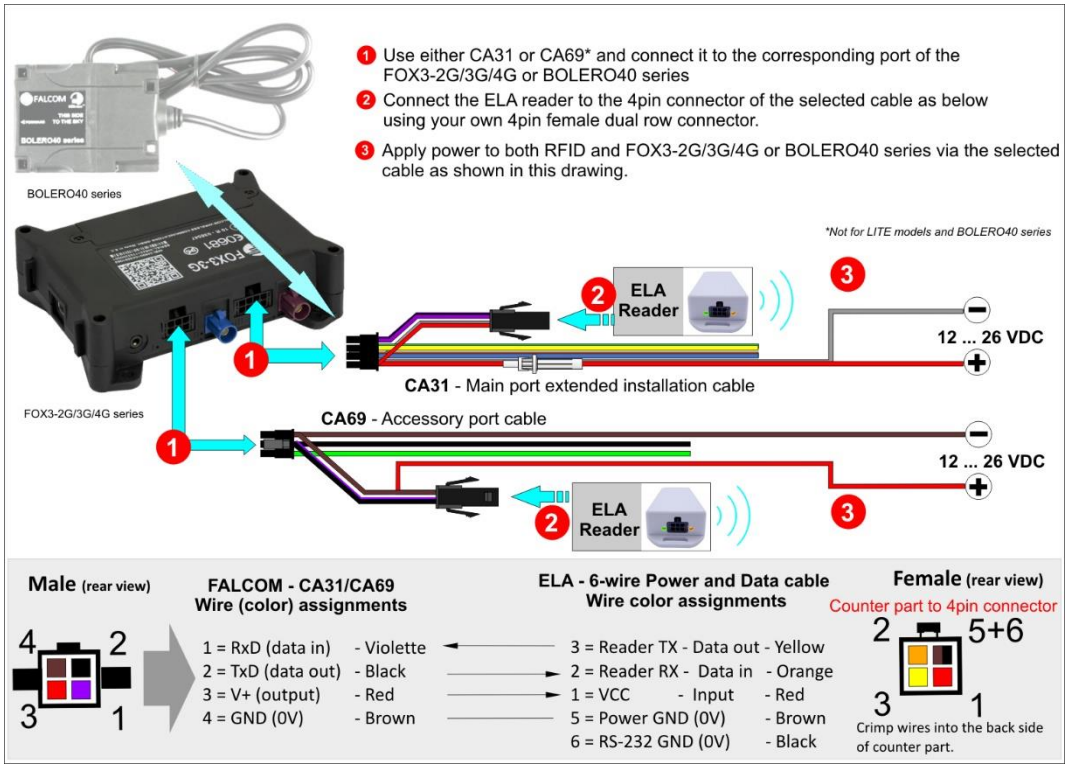

Figure 2: Use one of the cables to interface the ELA reader to FOX3/-3G

2.1 Testing RFID reader and active tags operation

- After connecting the RFID reader to one of the serial ports of the FOX3-2G/3G/4G, use the following steps to perform the test:
- Read the corresponding manual of the RFID reader you are using.
- Check the operating voltage of the RFID Reader.
- Connect the RFID reader to a FOX3-2G/3G/4G or BOLERO device as mentioned in chapter 2 above.
- Distribute all active tags within the reader operating area.
- Install and start the Lantronix Workbench software (see chapter 1.8).
- Start testing the system with FOX3 and ELA reader and sensors. To test this system locally, use the device configuration in chapter 3 or chapter 3.2 and replace TCP.Client.Send,8,"&(IMEI),Text:&(SerialData0)" in the alarms AL1 ... AL11 with MSG.Send.Serial1,8,"&(IMEI),Text:&(SerialData0)". In this way, the data from the reader received through the Serial Port 0 on the Main Port will be forwarded to the Serial Port 1 on the Accessory port, instead of forwarding to your remote server via TCP.

3 DEVICE CONFIGURATION FOR USING ELA READER

The following table shows some configuration examples to forward the data received from the ELA reader to your server using FOX3-2G/3G/4G series. Please note that, to test the alarms given below, you have to store them into the FOX3-2G/3G/4G using the Workbench Software. Before storing them into the device, change first the ID of tags in the configuration and enter the used Tag' Ids.

FOX3-2G/3G/4G Serial Port And Alarm Configuration For ELA Reader

The following configuration must be stored into the FOX3-2G/3G/4G series device using Workbench Software.

```
$PFAL,Cnf.Set,DEVICE.COMM.BINEVENT1[0]1)=5B,5D,i  // Defines fixed chars in hex to generate events on the 2nd port
$PFAL,Cnf.Set,DEVICE.SERIAL1[0]1).BAUDRATE=9600        // ELA reader operates at 9600 bps
$PFAL,MSG.Mode.Serial1[0]1)=40,B        // Sets the serial port 1 into binary event mode
```

1) 0 = FOX3-2G/3G/4G and BOLERO40 series; 1 = FOX3-2G/3G/4G series, but not LITE models

The ELA reader is assumed to be connected to the Serial Port 1 (6-pin accessory port of FOX3-2G/3G/4G), however if you want to connect the reader to the other serial port (Serial Port 0 on the 8-pin main port of FOX3-2G/3G/4G), just change the number **1** (marked in red) to **0** in both configuration lines above. **Hint**: This configuration can be sent to the FOX3-2G/3G/4G either remotely via TCP or locally through serial port.

ELA reader sends the ID of every RFID tag detected in its reading range through its serial port to the FOX3-2G/3G/4G. Every ID starts with "[" character (hex=5B) followed by the ID of the tag with its associated data and closed by "]" character (hex=5D) as shown in the example below. Below are shown just four examples on how to get the data from different sensors the reader sends and forward this data to your server. Further filtering and converting of this data should be implemented on the server side. For temperature and humidity monitoring application, you can also setup special configuration in the FOX3 to send alarms only if temperature or humidity of the tag exceeds a predefined threshold as shown in the example 4, using AL80 to AL85

```
[A5090002 01]<CRLF> // PUCK ID Tag (Identification Tag for telematics application)
[BA070449 01]<CRLF> // COIN ID Tag (Active RFID tag)
[AEC6100001]<CRLF> // COIN MAG Tag + MAGNET02 (Magnet sensor)
[A882716601]<CRLF> // COIN T Tag (Temperature sensor)
[87B6B00001]<CRLF> // COIN MOV Tag (Motion sensor)
[879975 0601]<CRLF> // COIN RH Tag (Humidity sensor)
```

EXAMPLE 1: This example shows how to configure the FOX3-2G/3G/4G and automatically forward the PUCK ID sensor data sent from the reader through the serial port and FOX3-2G/3G/4G ' IMEI and RMC protocol to a remote server.

The ID format of the PUCK ID **[**AC09000201**]** is: AC(hex) = wireless signal strength level (RSSI); 090002 = tag ID; 01 = reader's identifier. The RSSI level varies between 110 (decimal), for a very close tag, and 200 (decimal), for a more remote tag (with respect to the reader).

```
$PFAL,CNF.Set,AL1=Sys.eSerialdata1.TXT="090002":TCP.Client.Send,8,"&(IMEI),PUCKID:&(SerialData1)"
```

The FOX3-2G/3G/4G series device will transmit the following data to your server:

Default format: `DEVICE.PFAL.SEND.FORMAT="$",CKSUM,"","$<end>"`	**Customized:** DEVICE.PFAL.SEND.FORMAT="",NOCKSUM,"",""
$353816054967742,PUCKID:[AC09000201]*2A<CRLF> $GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715,,*0B <CRLF> $<end><CRLF>	353816054967742,PUCKID:[AC09000201]<CRLF> GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715, ,<CRLF><CRLF>

EXAMPLE 2: This example shows how to configure the FOX3-2G/3G/4G and automatically forward the COIN ID data sent from the reader through the serial port and FOX3-2G/3G/4G' IMEI and RMC protocol to a remote server using the SYS.eSerialData event. If you don't want to search for a specific text on the received serial string, just remove the part **.TXT="..."** from the serial data event.

```
$PFAL,CNF.Set,AL2=SYS.eSerialData1.TXT="070449":TCP.Client.Send,8,"&(IMEI),COINID:&(SerialData1)"
```

The FOX3-2G/3G/4G series device will transmit the following data to your server:

	Default format: DEVICE.PFAL.SEND.FORMAT="$",CKSUM,"","$<end>"	**Customized:** DEVICE.PFAL.SEND.FORMAT="",NOCKSUM,"",""
	$353816054967742,COINID:[BA07044901]*28 <<CRLF> $GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715,,*0B <CRLF> $<end><CRLF>	353816054967742,COINID:[BA07044901] <CRLF> GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715, ,<CRLF><CRLF>
FOX3-2G/3G/4G Serial Port And Alarm Configuration For ELA Reader		
EXAMPLE 2: This example shows how to configure the FOX3/-3G and automatically forward the COIN ID data sent from the reader through the serial port and FOX3-2G/3G/4G' IMEI and RMC protocol to a remote server using the `SYS.eSerialData` event. If you don't want to search for a specific text on the received serial string, just remove the part **.TXT="..."** from the serial data event.		
	$PFAL,CNF.Set,AL2=SYS.eSerialData1.TXT="070449":TCP.Client.Send,8,"&(IMEI),COINID:&(SerialData1)"	
	The FOX3-2G/3G/4G series device will transmit the following data to your server:	
	Default format: DEVICE.PFAL.SEND.FORMAT="$",CKSUM,"","$<end>"	Customized: DEVICE.PFAL.SEND.FORMAT="",NOCKSUM,"",""
	$353816054967742,COINID:[BA07044901]*28 <<CRLF> $GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715,,* 0B<CRLF> $<end><CRLF>	353816054967742,COINID:[BA07044901] <CRLF> GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715,, <CRLF><CRLF>
EXAMPLE 3: This example shows how to configure the FOX3-2G/3G/4G and automatically forward the magnetic sensor data (COIN MAG) sent from the reader through the serial port and FOX3-2G/3G/4G' IMEI and RMC protocol to a remote server. Due to the fact that during normal operation only the states OPEN and CLOSED of the magnet sensor (COIN MAG) with ID "C61" are relevant, the Trigger0 and Trigger1 are used to prevent sending of this ID every second.		
	$PFAL,CNF.Set,AL3=Sys.eSerialdata1.TXT="C61001"&Sys.Trigger.s1=low:Sys.Trigger0=high&Sys.Trigger1=high $PFAL,CNF.Set,AL4=Sys.eSerialdata1.TXT="C61000"&Sys.Trigger.s0=low:TCP.Client.Send,8,"&(IMEI),Open:&(SerialData1)"&Sys.Trigger0=high $PFAL,CNF.Set,AL5=Sys.eSerialdata1.TXT="C61001"&Sys.Trigger.s0=high:TCP.Client.Send,8,"&(IMEI),Closed:&(SerialData1)"&Sys.Trigger0=low	
	The FOX3-2G/3G/4G series device will transmit the following data to your server:	
	Default format: DEVICE.PFAL.SEND.FORMAT="$",CKSUM,"","$<end>"	**Customized:** DEVICE.PFAL.SEND.FORMAT="",NOCKSUM,"",""
	$353816054967742,Open:[AEC6100001]*67<CRLF> $GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715,,* 0B<CRLF> $<end><CRLF> $353816054967742,Closed:[AEC6100101]*05<CR><LF> $GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715,,* 07<CRLF> $<end><CRLF>	353816054967742,Open:[AEC6100001]<CRLF> GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715,, <CRLF><CRLF> 353816054967742,MS Closed:[AEC6100101]<CRLF> GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715,, <CRLF><CRLF>
EXAMPLE 4: This example shows how to configure the FOX3-2G/3G/4G and automatically forward the temperature and humidity data sent from the reader through the serial port and FOX3/-3G' IMEI and RMC protocol to a remote server. The ID format of the temperature sensor (COIN T) **[**A882716601**]** is: A8(hex) = wireless signal strength level (RSSI); 827 = tag ID; 166 (hex.) = Temperature value [166(hex) =358(dec.)= 22.4°C (358 * 0,0625°C) where 0.0625° is the sensor resolution]; 01 = reader's identifier. For more details, refer to the reader's data sheet.		

$PFAL,CNF.Set,AL6=Sys.eSerialdata**1**.**TXT**="827":TCP.Client.Send,8,"&(IMEI),TEMPERATURE:&(SerialData**1**)"

$PFAL,CNF.Set,AL7=Sys.eSerialdata**1**.**TXT**="997":TCP.Client.Send,8,"&(IMEI),HUMIDITY:&(SerialData**1**)"

The FOX3-2G/3G/4G series device will transmit the following data to your server:

Default format: DEVICE.PFAL.SEND.FORMAT="$",CKSUM,"","$<end>"	**Customized:** DEVICE.PFAL.SEND.FORMAT="",NOCKSUM,"",""
$353816054967742,TEMPERATURE:[A882716601]*1A<CRLF> $GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715,,* 0B<CRLF> $<end><CRLF> $353816054967742,HUMITITY:[BF9974BE01]*2A<CRLF> $GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715,,* 0B<CRLF> $<end><CRLF>	353816054967742,TEMPERATURE:[A882716601]<CRLF> GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715,, <CRLF><CRLF> 353816054967742,HUMITITY:[BF9974BE01]<CRLF> GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715,, <CRLF><CRLF>

If you want to be informed via a LED/buzzer when the temperature of the sensor goes above/below limits (in our example 7 °C), then you have to store the alarms AL80 to AL85, instead of AL6 and AL7.

$PFAL,CNF.Set,AL80=Sys.eSerialData0.Start6="06"?Sys.eSerialData0.Start6="05"?Sys.eSerialData0.Start6="04"Sys.eSerialData0.Start6="03"?Sys.eSerialData0.Start6="02":Sys.Counter3.Set=1

$PFAL,CNF.Set,AL81=Sys.eSerialData0.Start6="01"?Sys.eSerialData0.Start6="00":Sys.Counter3.Set=1

$PFAL,CNF.Set,AL82=Sys.eSerialData0.Start6="07"?Sys.eSerialData0.Start6="08"?Sys.eSerialData0.Start6="09"Sys.eSerialData0.Start6="0A"?Sys.eSerialData0.Start6="0B":Sys.Counter3.Set=0

$PFAL,CNF.Set,AL83=Sys.eSerialData0.Start6="0C"?Sys.eSerialData0.Start6="0D"?Sys.eSerialData0.Start6="0E"?Sys.eSerialData0.Start6="0F"?Sys.eSerialData0.Start6="1":Sys.Counter3.Set=0

$PFAL,CNF.Set,AL83=Sys.eSerialData0.Start6="2"?Sys.eSerialData0.Start6="3"?Sys.eSerialData0.Start6="4"?Sys.eSerialData0.Start6="5"?Sys.eSerialData0.Start6="6":Sys.Counter3.Set=0

$PFAL,CNF.Set,AL84=Sys.Counter.e3:IO5.Set=cyclic,200,100 // Install a LED or Buzzer to IO1 pin on the main port connector

$PFAL,CNF.Set,AL85=Sys.Counter.s3=1:IO5.Set=low

EXAMPLE 5: This example shows how to configure the FOX3-2G/3G/4G and automatically forward the motion sensor data sent from the reader through the serial port and FOX3-2G/3G/4G ' IMEI and RMC protocol to a remote server. To know if the sensor is standing or moving, only standing-ID "B6B00001]" is required for this configuration and all other IDs received from this sensor will be detected as moving. The ID format of the motion sensor (MOV) **[**97B6B1E001**]** is: 9B(hex) = wireless signal strength level (RSSI); B6B = tag ID; 1E0 (hex.) = value of measured movement [1E0(hex)=358(dec.)]; 01 = reader's identifier. The ID of the motion sensor "B6B00001]" represents the standing state of sensor and all ID including the text "B6B" represent moving state of sensor. The Counter0 and Timer18 separate these sensor states.

$PFAL,CNF.Set,AL8=Sys.eSerialdata**1**.TXT="B6B":Sys.Counter0.Set=1&Sys.Timer18.Start=single,2000

$PFAL,CNF.Set,AL9=Sys.eSerialdata**1**.TXT="B6B00001]":Sys.Counter0.Set=2&Sys.Timer18.Stop

$PFAL,CNF.Set,AL10=Sys.Timer.e0&Sys.Counter.s0=1:TCP.Client.Send,8,"&(IMEI),**MOVING**:&(SerialData**1**)"

$PFAL,CNF.Set,AL11=Sys.eSerialdata**1**.TXT="B6B00001]"&Sys.Counter.s0=2&Sys.Timer.s18=active:TCP.Client.Send,8,"&(IMEI),**STANDING**:&(Seri alData**1**)"

The FOX3-2G/3G/4G series device will transmit the following data to your server:

Default format: DEVICE.PFAL.SEND.FORMAT="$",CKSUM,"","$<end>"	**Customized:** DEVICE.PFAL.SEND.FORMAT="",NOCKSUM,"",""

	$353816054967742,STANDING:[9BB6B00001]*52<CRLF> $GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715,,*0B <CRLF> $<end><CRLF> $353816054967742,MOVING:[97B6B1E001]*4B<CRLF> $GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715,,*0B <CRLF> $<end><CRLF>	353816054967742,STANDING:[9BB6B00001]<CRLF> GPRMC,115541.000,A,5040.4095,N,01058.8538,E,0.03,0.00,020715 ,,<CRLF><CRLF> 353816054967742,MOVING:[97B6B1E001]<CRLF> GPRMC,115540.000,A,5040.4095,N,01058.8537,E,0.01,0.00,020715 ,,*0<CRLF><CRLF>

Table 4: FOX3-2G/3G/4G device configuration for using ELA RFID reader and tags

3.1 Additional documentation & software tools

If this application note does not cover all the information you need to setup, refer to the additional documents listed below, which can be found on the Product Index or Application Notes pages.

Filename	Description
AVL_PFAL_Configuration_Command_Set.pdf	Lists and describes all PFAL commands supported by the AVL devices.
FOX3_HardwareManual.pdf	Contains instructions for safety and operation of the FOX3/-3G device.
AppNotes_AVL_Installation_Guide.pdf	Provides all the necessary information about installing the Lantronix products properly and safely.
AVL_AppNote_RFID_Howto.pdf	Integration of the Lantronix passive RFID reader with Lantronix AVL devices.
FOX3_3G-promotion-kit_getting_started.pdf	Contains information about the promotion kit.
Workbench Software	**Description**
Lantronix Workbench	Lantronix Workbench configuration tool (Windows XP, Windows Vista, Windows 7

3.2 Evaluating your configuration

To test and store the configuration given in chapter 1.6 into one device of FOX3-2G/3G/4G series, follow the steps below (as reference use fig. 3 below). BOLERO40 series cannot be locally tested due to it has only one serial port.

1. Download and install the Lantronix Workbench software (see chapter above)
2. Connect your FOX3-2G/3G/4G series device to a free PC COM port via the control box included in the promotion kit, power up your device or use a Mini-USB to USB cable and connect it the FOX3-2G/3G/4G and your Laptop/PC. Install the USB driver from our website: https://www.lantronix.com/support/
3. Connect the cable CA69 to the 6pin accessory port of the FOX3-2G/3G/4G (not available for LITE models)
4. Connect your reader to the 4pin connector of the CA31 using your own 4pin female dual row connector and apply 12V power to the reader via CA69 (see chapter 2)
5. Start the Lantronix Workbench software, open a COM Port (1), a Terminal (2) and an Editor (3), then select the **COM port** (4) and **Port settings** (115200 bps, 8 Data bits, No Parity bit, 1 Stop bit, None Flow control).

6. Click on the **Connect** icon (II) on the left of the text "Port", to connect to. Connect the Console (5) to the **COM Port** and the **Editor** (6) to the **Console** from the **Connection view** (on the right side of the Workbench software).
7. Copy and paste the configuration below in to the editor of the Workbench and double click each line separately to send it to the FOX3/-3G. Errors are indicated by coloured lines. Red coloured lines indicate errors within the line, while blue coloured lines indicate configuration is successfully saved.

```
$PFAL,Cnf.Set,DEVICE.COMM.BINEVENT1=5B,5D,i
$PFAL,Cnf.Set,DEVICE.SERIAL1.BAUDRATE=9600
$PFAL,MSG.Mode.Serial1=40,B
$PFAL,CNF.Set,AL1=Sys.eSerialdata1.TXT="090002":MSG.Send.Serial1,0,"&(IMEI),PUCKID:&(SerialData1)"
$PFAL,CNF.Set,AL2=SYS.eSerialData1.TXT="070449":TCP.Client.Send,8,"&(IMEI),&(SerialData1)"
$PFAL,CNF.Set,AL3=Sys.eSerialdata1.TXT="C61001"&Sys.Trigger.s1=low:Sys.Trigger0=high&Sys.Trigger1=high
$PFAL,CNF.Set,AL4=Sys.eSerialdata1.TXT="C61000"&Sys.Trigger.s0=low:TCP.Client.Send,8,"&(IMEI),Open:&(SerialData1)"&Sys.Trigger0=high
$PFAL,CNF.Set,AL5=Sys.eSerialdata1.TXT="C61001"&Sys.Trigger.s0=high:TCP.Client.Send,8,"&(IMEI),Close:&(SerialData1)"&Sys.Trigger0=low
$PFAL,CNF.Set,AL6=Sys.eSerialdata1.TXT="827":TCP.Client.Send,8,"&(IMEI),TEMPERATURE:&(SerialData1)"
$PFAL,CNF.Set,AL7=Sys.eSerialdata1.TXT="997":TCP.Client.Send,8,"&(IMEI),HUMIDITY:&(SerialData1)"
$PFAL,CNF.Set,AL8=Sys.eSerialdata1.TXT="B6B":Sys.Counter0.Set=1&Sys.Timer18.Start=single,2000
$PFAL,CNF.Set,AL9=Sys.eSerialdata1.TXT="B6B00001]":Sys.Counter0.Set=2&Sys.Timer18.Stop
$PFAL,CNF.Set,AL10=Sys.Timer.e0&Sys.Counter.s0=1:TCP.Client.Send,8,"&(IMEI),MOVING:&(SerialData1)"
$PFAL,CNF.Set,AL11=Sys.eSerialdata1.TXT="B6B00001]"&Sys.Counter.s0=2&Sys.Timer.s18=active:TCP.Client.Send,8,"&(IMEI),STANDING:&(SerialD ata1)"
```

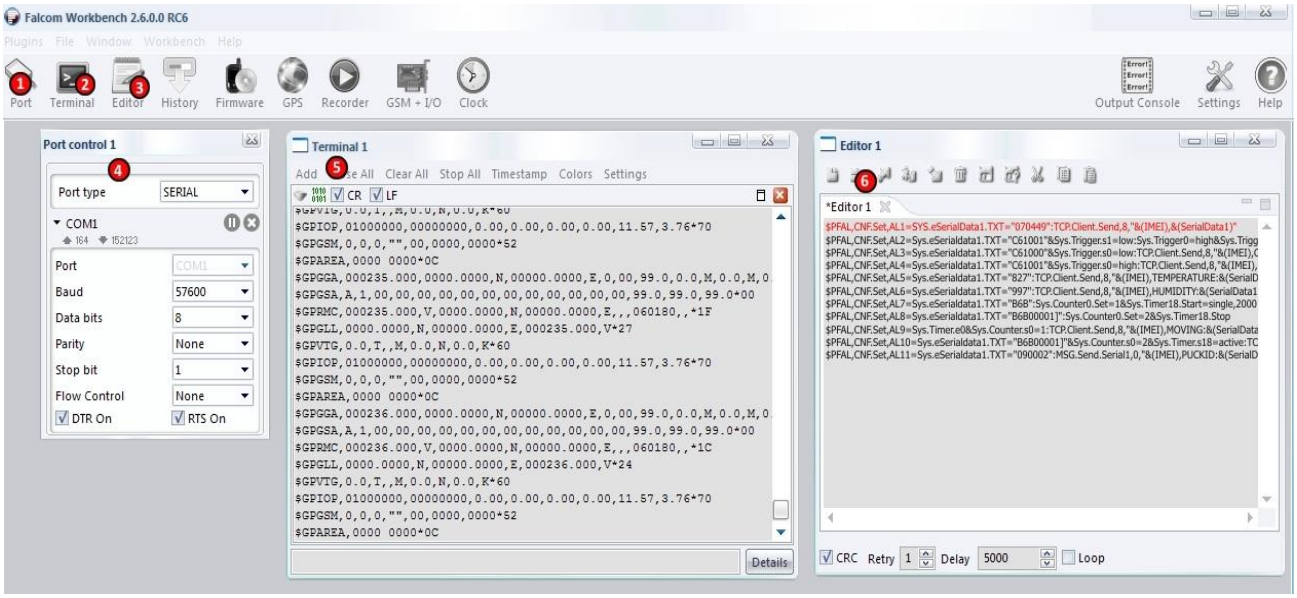

Figure 3: Workbench evaluation & configuration software

8. Now you can start testing the system by deploying the RFID tags to objects to be tracked and approaching them with the RFID reader connected to FOX3-2G/3G/4G series device.