

## Application Note

### *Garmin<sup>®</sup> PND Integration with FOX3-2G/3G/4G series*



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## Revision History

Date	Rev.	Comments
December 2017	1.0.0	Initial version.
October 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](http://www.lantronix.com/support/documentation).

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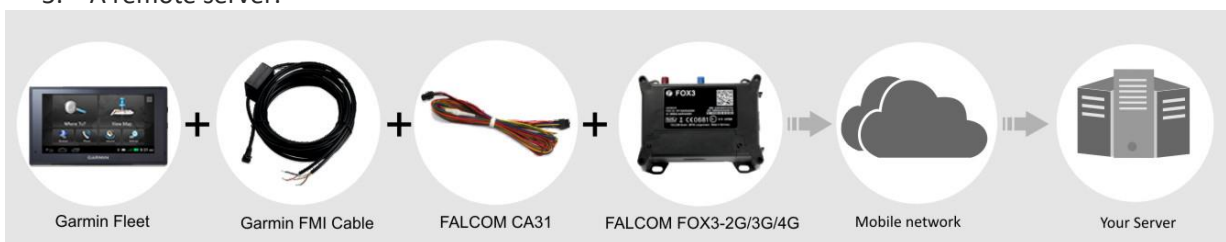
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# 1 ABOUT THIS DOCUMENT

This guide shows how to connect a Garmin® PND device that support Fleet Management Interface (FMI) to a Lantronix FOX3-2G/3G/4G device and how to configure your Lantronix device, manage the connection to a Garmin® PND and send data to the device from your server.

## 1.1 Requirements

1. FOX3-2G/3G/4G device (with STR processor) running firmware version avl\_2.13.0 and above or FOX3-2G/3G/4G device (with CT processor) running firmware version avl\_3.1.0 and above.
2. Garmin® device with firmware that supports the Garmin® Fleet Management Interface Control Specification
3. Garmin FMI 15 data cable
4. CA31 cable to interface Garmin® and FOX3-2G/3G/4G. (See wiring details in chapter below.) This can be provided by Lantronix. Contact technical support.
5. A remote server.



## 1.2 Interface Garmin® PND with FOX3-2G/3G/4G

To interface both devices use CA31 cable. This cable has all you need, the RS-232 communicate interface and power supply lines to power both devices. The 4pin connector provides an RS-232 interface (RX, XT) to communicate with and the power pins (IN+, GND) to power up the Garmin® device. At the end of this cable there is 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).

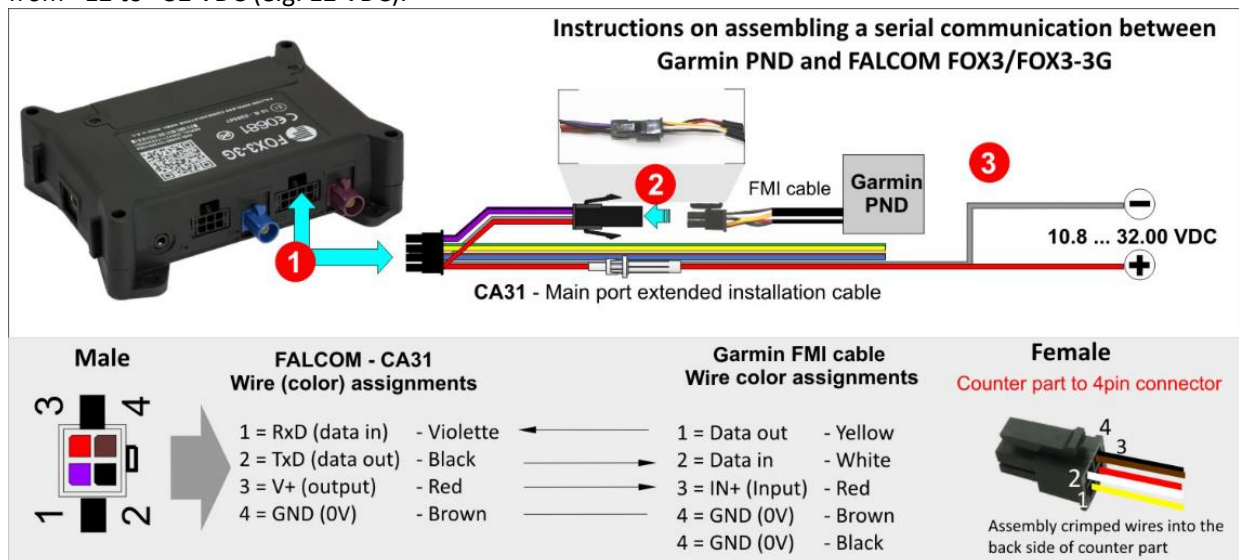


Figure 1: Use the CA31 cable to interface a Garmin® device to FOX3/FOX3-3G device

To connect the Garmin® FMI cable with the CA31 you have to use a 4pin female dual row connector (the counter part to the 4pin connector on the CA31) and mount it at the end of Garmin® FMI cable. The counter part with manufacturer part number "662004113322" can be ordered from third-party distributors.

Below a picture how the counter part to the 4pin connector looks like after assembled to the Garmin® FMI cable.



Figure 2: 4pin female dual row connector assembled at the end of the FMI cable

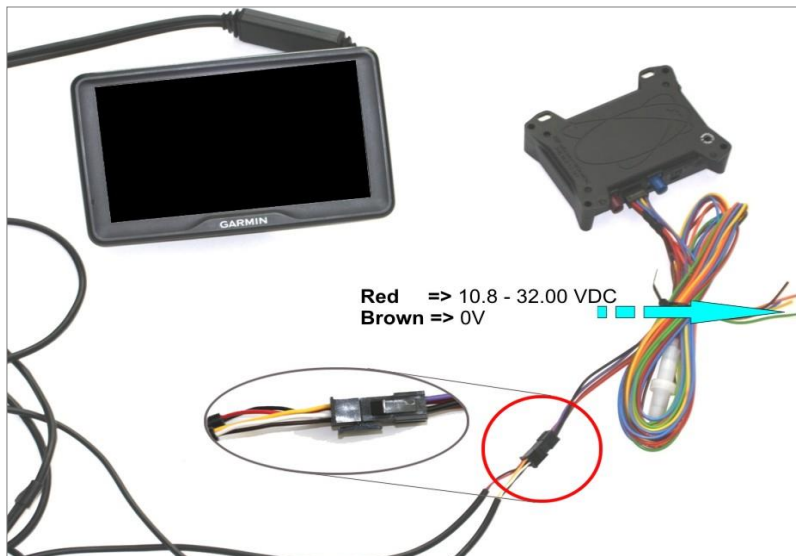


Figure 3: Interlink the devices with the help of cables and apply power

### 1.3 FOX3-2G/3G/4G device configuration setup for your server

#### 1.3.1 Basic device configuration settings

Follow these steps to configure the device and connect to a remote server:

TO DO	Device settings via PFAL commands	Notices
Enter GPRS settings and send to device	<b>\$PFAL,Cnf.Set,GPRS.APN=internet.t-d1.de</b>	Enter the APN of your SIM card provider
	<b>\$PFAL,Cnf.Set,GPRS.QOS=3,4,3,0,0</b>	Check this settings with your SIM card provide
	<b>\$PFAL,Cnf.Set,GPRS.QOSMIN=0,0,0,0,0</b>	Check this settings with your SIM card provide
	<b>\$PFAL,Cnf.Set,PPP.USERNAME=t-d1</b>	Enter the username of your SIM card provider
	<b>\$PFAL,Cnf.Set,PPP.PASSWORD=gprs</b>	Enter the password of your SIM card provider
	<b>\$PFAL,Cnf.Set,GPRS.AUTOSTART=1</b>	Set GPRS to start automatically
Enter TCP settings and send to device	<b>\$PFAL,Cnf.Set,TCP.CLIENT.CONNECT=1,Server Address,Port</b>	Enter the IP of the remote server. e.g. 33.216.222.188 and port e.g. 2442
Enter SIM PIN and send to device	<b>\$PFAL,Cnf.Set,DEVICE.PIN=1111</b>	Enter the PIN of the inserted SIM card
Enter settings and send to device	<b>\$PFAL,Cnf.Set,TCP.CLIENT.LOGIN=2,1</b>	Configure to send login data to the remote server on connect. This setting is very important when using GpsGate server. Otherwise no connection to the server will be done.
	<b>\$PFAL,Cnf.Set,DEVICE.SERIAL0.FORCEON=on</b>	Sets the first serial port into the Active mode. To keep the serial communication link between the Garmin® PND and FOX3-2G/3G/4G permanently active, the first serial interface on FOX3-2G/3G/4G should be set into the active mode.

### 1.3.2 Enable communication between your Garmin® PND, FOX3-2G/3G/4G and your server

Follow these steps to configure the device to receive the data from the Garmin® device and forward this data to a remote server and vice-versa:

TO DO	CONFIGURATION	DESCRIPTION
Enter settings and send to device	<code>\$PFAL,Cnf.Set,DEVICE.SERIAL0.BAUDRATE=9600</code>	Sets up the serial port baud rate to 9600bps. Garmin® devices operate at a fixed bps of 9600 and to communicate with each other they must have the same baud rate.
	<code>\$PFAL,Cnf.Set,DEVICE.COMM.BINEVENT=10,"0x10,0x03",i</code>	All messages send out from the Garmin® device start with a hexadecimal <b>10</b> start-of-message character, and are terminated by a checksum byte followed by hexadecimal <b>10</b> and <b>03</b> characters. This configuration is needed to set up a bit mask for event generation on the serial port when receiving such messages from Garmin® device. <i>0x10 = Data Link Escape and 0x03 = End of Text. The letter "i" means that both characters (0x10 and 0x03) are included in the messages when it is sent to the remote server.</i>
	<code>\$PFAL,MSG.Mode.Serial0=60,B</code>	Set up the first serial port into binary event. No other data is sent to the Garmin® device, except the messages received from the remote server.
Configure alarm settings and send to device	<code>\$PFAL,Cnf.Set,AL5=Sys.eSerialdata0:TCP.Client.Send,0,"gg.garmin=&amp;(Serialdata0)" //without GPS data</code> <code>\$PFAL,Cnf.Set,AL5=Sys.eSerialdata0:TCP.Client.Send,8,"gg.garmin=&amp;(Serialdata0)" // with GPS data</code>	
		<i>This alarm (AL5) sends every message received on the first serial port from the Garmin® device to the remote server on "Sys.eSerialdata0" event. The message identifier "gg.garmin=" means, that the Garmin® messages are identified on your server by "gg.garmin=" identifier. The identifier should be implemented on your server.</i>
Send this command from your server to device	<code>\$PFAL,MSG.Send.HexSerial0,0,"10,A,2,32,0,C2,10,3,10,A1,C,0,0,4,0,1,80,2,80,A,80,B,80,37,10,3,10,A1,2,5,0,58,10,3,10,A1,6,50,2,60,2,1,0,A4,10,3"</code>	
Received data on remote server sent from device		<i>After sending the command above from your server to the Lantronix device, the remote server will receive then the data as below e.g. data from the Garmin device, without GPS data</i>
		<code>\$gg.garmin=[0x10][0xA1][0x1E][0x00]/S[0xB8]1[0x01][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00][0x00]2[0x00][0x00][0x00]S[0x10][0x03]*82[0x0D][0x0A]</code>

To send a message from your server to the Garmin® device connected to the FOX3-2G/3G/4G, use the PFAL command `$PFAL,MSG.Send.HexSerial0,0,"hex value"` and enter the hexadecimal value, separated by comma "," that you want to send to the Garmin® device. The hex value should be one of the commands from the Garmin® FMI protocol.

For example, to enable the FMI protocol on the Garmin device send from your server this command:

```
$PFAL,MSG.Send.HexSerial0,0,"10,a1,12,21,00,7a,b5,08,31,48,61,6c,6c,6f,20,53,61,6c,65,68,00,c7,10,03"
```

On Garmin® device the connection icon should change from red to green.

After the connection is done, send from your server the following command containing a message to Garmin device:

```
$PFAL,MSG.Send.HexSerial0,0,"10,a1,12,21,00,7a,b5,08,31,48,61,6c,6c,6f,20,53,61,6c,65,68,00,c7,10,03"
```

On Garmin® device an icon showing an incoming message appears.

In this way, you can communicate from your server with Garmin devices using FOX3-2G/3G/4G devices as a gateway between server and Garmin® devices.

### 1.4 Developer references for integration of Garmin FMI protocol on your server

If you plan to integrate Garmin® FMI protocols on your server, refer to the link below:

<http://developer.garmin.com/fleet-management/overview/>

If you can not find the required information or if you need help contact Garmin® developers using their online form:

<http://developer.garmin.com/>